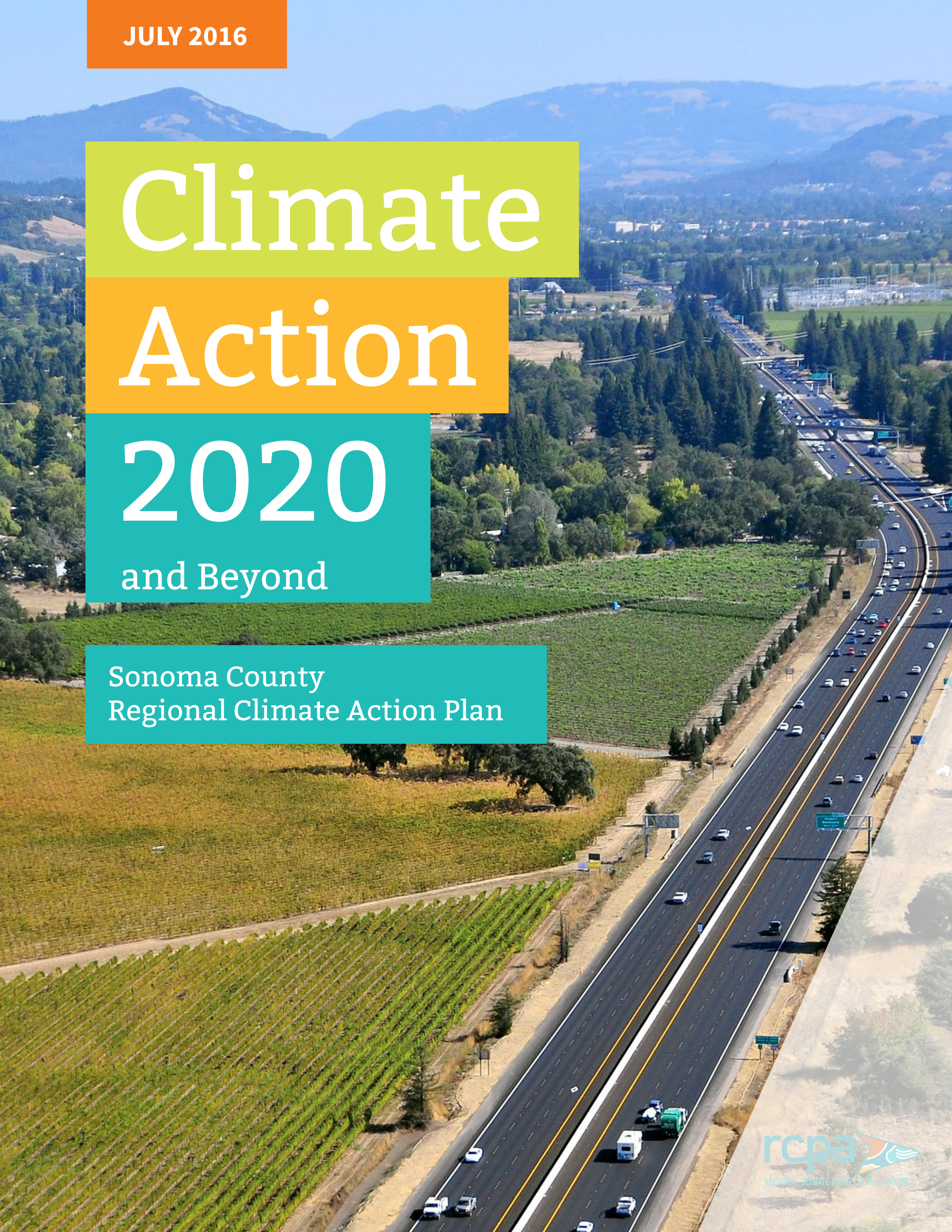

JULY 2016

# Climate Action 2020 and Beyond

## Sonoma County Regional Climate Action Plan

rcpa
REGIONAL CLIMATE PROTECTION AUTHORITY

## Climate Action 2020 and Beyond

**July, 2016**

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More information: rcpa.ca.gov/climate-action-2020

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# Climate Action 2020 and Beyond

Climate Action 2020 and Beyond (CA2020) is a collaborative effort among all nine cities and the County of Sonoma to reduce greenhouse gas (GHG) emissions and respond to the impacts of climate change. This effort would not be possible without countless contributions from members of our Sonoma County community – thank you all!

**This Plan was prepared by:**

The Sonoma County Regional Climate Protection Authority (RCPA)

**On behalf of:**

County of Sonoma
City of Cloverdale
City of Cotati
City of Healdsburg
City of Petaluma
City of Rohnert Park
City of Santa Rosa
City of Sebastopol
City of Sonoma
Town of Windsor

## Acknowledgements

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The RCPA Board has representatives from all ten local jurisdictions in Sonoma County. The following elected officials oversaw the development of this plan from 2012-2016:

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### Staff Working Group

The Plan was developed by a group of local government staff from the RCPA, SCTA, and each of the ten local jurisdictions. This Staff Working Group was responsible for project management, data collection, policy research, community outreach, reviewing and editing draft plan language, and seeking and responding to direction from the RCPA Board, City/Town Councils, and the Board of Supervisors.

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# Preface
# How to Use This Plan

Given the wide audience and diverse interests in the community, Climate Action 2020 and Beyond (CA2020) is designed to be accessible and useful to a wide range of users. Readers will quickly notice that actions in CA2020 to reduce greenhouse gas (GHG) emissions and adapt to a changing climate are complex and touch on many aspects of everyday life in Sonoma County. Although most actions will be the responsibility of local governments and countywide agencies, Sonoma County's residents, businesses, and community groups must remain engaged in order to achieve the goal of reducing community-wide GHG emissions. This engagement may be action-oriented and contribute directly to accomplishing the actions envisioned in CA2020, or may be focused on ensuring that local representatives are accountable for specific commitments under CA2020.

## A Readers' Guide

CA2020 is designed to allow users to dig in to a depth that best suits their interests and needs. References and technical appendices are provided for those who need the most detailed information. CA2020's overall structure provides users an opportunity to directly access the information that they need.

- Chapter 1 provides the overall context for CA2020, including the basics of climate change science and the essential Call to Action that is needed for community-wide action. Chapter 1 also describes the unique regional (countywide) approach that Sonoma County will use to reduce GHG emissions as well as an overview of plan implementation. Chapter 1 is the best place to start for most readers and provides important context for the rest of CA2020.
- Chapter 2 provides an inventory of GHG emissions in Sonoma County by sector (e.g., energy, land use and transportation) and by each city and the County. The inventory is not only the key benchmark for future GHG reductions, but it helps focus attention on the greatest opportunities for emission reductions.
- Chapter 3 lays out the overall strategy for reducing GHG emissions in each sector to meet CA2020's target of reducing emissions to 25% of 1990 levels by 2020 and provides the foundation for long-term success in reducing GHG emissions. These reduction measures are the basis for the specific actions identified in Chapter 5.
- Chapter 4 describes how CA2020 will be implemented, including coordination by the Regional Climate Protection Authority and a management and monitoring structure at each partner agency. Chapter 4 also includes a schedule for implementing the GHG reduction measures and describes ongoing monitoring, adaptive management, and community involvement.

- Chapter 5 contains the near-term action plans for each city and the unincorporated County. These are the specific GHG reduction measures that will be adopted and implemented by each community. This chapter also contains a GHG profile for each community and population, housing, and employment projections throughout the CA2020 planning period (i.e., to 2050).
- Chapter 6 describes Sonoma County's "climate readiness," highlighting each community's vulnerability to the hazards of climate change (e.g., warmer temperatures, increased flooding risk, increased wildfire risk). Chapter 6 also describes goals to improve the resilience of Sonoma County communities to climate-related hazards.

# A Community-Wide Plan

As a community-wide plan, CA2020 will have many different audiences, each with their own interests and needs. This section is intended to focus specific audiences on the aspects of CA2020 that will be of greatest interest and usefulness.

## Local Governments

Cities and the County will want to be familiar with the overall CA2020 implementation structure described in Chapter 4. In addition, city and County decision makers and staff will also be interested in the sections in Chapter 5 that pertain to their respective jurisdictions. These sections provide detail on specific GHG reduction measures that each jurisdiction has identified for local implementation.

## Regional Agencies

Regional (countywide) agencies (the Regional Climate Protection Authority, Sonoma County Transit, Sonoma Clean Power, etc.) have a critical role in reaching the 2020 GHG reduction target by providing countywide services and programs that would be difficult for local governments to provide on their own. Each agency will want to understand its responsibilities under CA2020, which are summarized in Chapter 3 and Appendix C. Agencies will also want to be familiar with the implementation framework in Chapter 4.

## Community Groups

The interests of Sonoma County community organizations are extremely varied. Many groups will get the information they need from Chapter 1 and the list of GHG reduction measures in Chapter 3 and Appendix C. Groups with a specific focus will want to review the GHG reduction strategy for their sector of interest. For example, a community organization with a focus on renewable energy will want to carefully review the GHG reduction strategy for the Building Energy sector in Chapter 3 and the energy-related measures in Appendix C.

### Residents and Businesses

The interests of individual Sonoma County residents and businesses are almost infinitely varied. As with community groups, many people will find more than enough information about CA2020 in Chapter 1 and can use that as a jumping-off place for more in-depth review of CA2020. Chapter 1 also describes the outreach and engagement associated with CA2020. Individuals interested in climate change actions of a specific city or the County will want to read that jurisdiction’s section in Chapter 5. Those with a more countywide interest may want to focus on the bigger-picture GHG reduction strategies in Chapter 3. Lastly, all residents and businesses are encouraged to read the “How Can Sonoma County Residents Help?” section in Chapter 1 and the climate change adaptation goals in Chapter 6.

# Contents

Page

List of Tables ..... vi

List of Figures ..... ix

List of Acronyms and Abbreviations ..... xii

Glossary of Terms ..... xv

**Executive Summary ..... ES-1**

ES.1 Introduction ..... ES-1

ES.2 A Call to Action: Climate Change is a Serious Threat, But We Know What to Do ..... ES-1

ES.3 A Regional Approach to Reducing GHG Emissions ..... ES-3

ES.4 Putting This Climate Action Plan to Work ..... ES-4

ES.5 How Will This Plan Help Sonoma County Residents and Businesses? ..... ES-4

ES.6 How Can Sonoma County Residents Help? ..... ES-6

ES.7 Public Outreach and Community Engagement ..... ES-6

**Chapter 1 The Framework for Sonoma County Climate Action ..... 1-1**

1.1 Introduction ..... 1-1

1.2 A Call to Action ..... 1-1

1.2.1 Climate Change Is a Serious Threat, But We Know What to Do ..... 1-1

1.2.2 Building on Existing Climate Action Efforts ..... 1-5

1.2.3 How Will this Plan Help Sonoma County Residents and Businesses? ..... 1-8

1.3 How Does This Plan Work? ..... 1-11

1.3.1 A Regional Approach to Reducing GHG Emissions ..... 1-11

1.3.2 Putting this Climate Action Plan to Work ..... 1-14

1.3.3 How Can Sonoma County Residents Help? ..... 1-16

1.4 Public Outreach and Community Engagement ..... 1-17

1.4.1 Stakeholder Advisory Group ..... 1-18

1.5 Relationship between the CAP and CEQA ..... 1-19

**Chapter 2 Greenhouse Gas Emissions in Sonoma County ..... 2-1**

2.1 Introduction ..... 2-1

2.2 Measuring Emissions ..... 2-2

2.2.1 What Is in the Inventories? ..... 2-2

2.2.2 Which Years Were Measured? ..... 2-6

2.3 Inventory Results ..... 2-7

2.3.1 GHG Emissions in Sonoma County by Sector ....... 2-7
2.3.2 GHG Emissions in Sonoma County by Jurisdiction ....... 2-19
2.3.3 How Does This Analysis Differ from Previous Inventories? ....... 2-20
2.4 Other Emissions Sources and Carbon Sinks ....... 2-21
2.4.1 Biological Carbon Sequestration ....... 2-22
2.4.2 Emissions from Consumption of Goods and Services ....... 2-26
2.4.3 Industrial and Commercial Stationary Sources ....... 2-27
2.4.4 Emissions from Air Travel ....... 2-28
**Chapter 3 Reducing Community Emissions ....... 3-1**
3.1 Introduction ....... 3-1
3.2 Greenhouse Gas Reduction Target and Goals ....... 3-2
3.2.1 Climate Action 2020 Target ....... 3-2
3.2.2 Long-Term Goals and Vision ....... 3-3
3.2.3 Advanced Climate Initiatives ....... 3-8
3.3 Overall Greenhouse Gas Reduction Strategy ....... 3-8
3.3.1 GHG Reduction Goals ....... 3-9
3.4 State GHG Reduction Measures ....... 3-11
3.5 Regional GHG Reduction Measures ....... 3-14
3.6 Local GHG Reduction Measures ....... 3-23
**Chapter 4 Implementation ....... 4-1**
4.1 Introduction ....... 4-1
4.2 Coordinated Implementation ....... 4-1
4.2.1 The Role of RCPA ....... 4-2
4.2.2 The Role of RCPA Members ....... 4-4
4.2.3 The Role of Regional Entities ....... 4-5
4.2.4 The Role of the Community ....... 4-6
4.2.5 Implementation Strategy ....... 4-7
4.2.6 Implementation Schedule ....... 4-9
4.3 Funding and Financing ....... 4-14
4.3.1 Plan Implementation Costs and Benefits ....... 4-14
4.3.2 Government Funding Strategies ....... 4-15
4.3.3 Private Sector Financing ....... 4-16
4.4 Community Engagement ....... 4-16
4.5 Evaluation and Monitoring ....... 4-16
4.6 Adaptive Management ....... 4-17
4.6.1 Learning from What Works and What Doesn’t ....... 4-17

4.6.2 Implementation Beyond 2020 ....................4-18

**Chapter 5 Community Greenhouse Gas Profiles and Emissions Reductions for 2020 ....................5-1**

5.1 Cloverdale ....................5-3
5.1.1 Community Summary....................5-3
5.1.2 Cloverdale's Existing Actions to Reduce Greenhouse Gas Emissions....................5-5
5.1.3 Greenhouse Gas Inventory and Forecast ....................5-7
5.1.4 Greenhouse Gas Reduction Goal and Measures ....................5-10
5.1.5 Municipal Greenhouse Gas Reduction Measures....................5-16
5.2 Cotati ....................5-17
5.2.1 Community Summary....................5-17
5.2.2 Cotati's Existing Actions to Reduce GHG Emissions ....................5-19
5.2.3 Greenhouse Gas Inventory and Forecast ....................5-24
5.2.4 Greenhouse Gas Reduction Goal and Measures ....................5-26
5.2.5 Municipal Greenhouse Gas Reduction Measures....................5-32
5.3 Healdsburg ....................5-34
5.3.1 Community Summary....................5-34
5.3.2 Healdsburg's Existing Actions to Reduce GHG Emissions ....................5-36
5.3.3 Greenhouse Gas Inventory and Forecast ....................5-40
5.3.4 Greenhouse Gas Reduction Goal and Measures ....................5-43
5.3.5 Municipal Greenhouse Gas Reduction Measures....................5-50
5.4 Petaluma ....................5-52
5.4.1 Community Summary....................5-52
5.4.2 Petaluma's Existing Actions to Reduce GHG Emissions ....................5-54
5.4.3 Greenhouse Gas Inventory and Forecast ....................5-59
5.4.4 Greenhouse Gas Reduction Goal and Measures ....................5-61
5.4.5 Municipal Greenhouse Gas Reduction Measures....................5-67
5.5 Rohnert Park ....................5-69
5.5.1 Community Summary....................5-69
5.5.2 Rohnert Park's Existing Actions to Reduce GHG Emissions ....................5-71
5.5.3 Greenhouse Gas Inventory and Forecast ....................5-76
5.5.4 Greenhouse Gas Reduction Goal and Measures ....................5-78
5.5.5 Municipal Greenhouse Gas Reduction Measures....................5-85
5.6 Santa Rosa....................5-87
5.6.1 Community Summary....................5-87
5.6.2 Santa Rosa's Existing Actions to Reduce GHG Emissions....................5-89
5.6.3 Greenhouse Gas Inventory and Forecast – 2007....................5-91

5.6.4 Greenhouse Gas Reduction Goal and Measures ........ 5-92
5.7 Sebastopol ........ 5-102
5.7.1 Community Summary ........ 5-102
5.7.2 Sebastopol's Existing Actions to Reduce GHG Emissions ........ 5-104
5.7.3 Greenhouse Gas Inventory and Forecast ........ 5-106
5.7.4 Greenhouse Gas Reduction Goal and Measures ........ 5-108
5.7.5 Municipal Greenhouse Gas Reduction Measures ........ 5-115
5.8 Sonoma ........ 5-116
5.8.1 Community Summary ........ 5-116
5.8.2 Sonoma's Existing Actions to Reduce GHG Emissions ........ 5-118
5.8.3 Greenhouse Gas Inventory and Forecast ........ 5-123
5.8.4 Greenhouse Gas Reduction Goal and Measures ........ 5-126
5.8.5 Municipal Greenhouse Gas Reduction Measures ........ 5-132
5.9 Windsor ........ 5-134
5.9.1 Community Summary ........ 5-134
5.9.2 Windsor's Existing Actions to Reduce GHG Emissions ........ 5-136
5.9.3 Greenhouse Gas Inventory and Forecast ........ 5-140
5.9.4 Greenhouse Gas Reduction Goal and Measures ........ 5-142
5.9.5 Municipal Greenhouse Gas Reduction Measures ........ 5-148
5.10 Unincorporated Sonoma County ........ 5-150
5.10.1 Community Summary ........ 5-150
5.10.2 The County's Existing Actions to Reduce GHG Emissions ........ 5-152
5.10.3 Greenhouse Gas Inventory and Forecast ........ 5-156
5.10.4 Greenhouse Gas Reduction Goal and Measures ........ 5-158
5.10.5 Municipal Greenhouse Gas Reduction Measures ........ 5-164

**Chapter 6 Sonoma County Climate Readiness ........ 6-1**
6.1 Introduction and Background ........ 6-1
6.2 Climate Change Projections ........ 6-1
6.3 Vulnerability Assessment ........ 6-2
6.3.1 Climate Change Hazards in Sonoma County ........ 6-3
6.3.2 Climate Vulnerabilities in Sonoma County ........ 6-9
6.4 Responding to Climate Change Vulnerabilities ........ 6-14
6.4.1 Sonoma County Climate Ready Goals ........ 6-15
6.4.2 Climate Resilience Co-benefits from GHG Reduction Strategies in CA2020 ........ 6-18
6.5 Next Steps ........ 6-18

**Chapter 7 References ........ 7-1**

## Appendices

**Appendix A** **Climate Action 2020 Community Climate Action Plan Consistency Checklist Template**
**Appendix B** **Inventory and Forecast Detail**
**Appendix C** **Reduction Measure Detail and Analysis Methods**
**Appendix D** **Funding and Financing Options**
**Appendix E** **Example Municipal Measures**
**Appendix F** **Community Involvement**

# List of Tables

**Tables** **Page**

1.2-1 Principal GHG Emissions 1-3

1.2-2 Community Co-Benefits 1-10

2-1 Summary of Countywide Emissions 2-2

2-2 Key Activity Data by GHG Sector 2-4

2-3 GHG Inventory and Forecast Results by Sector, and Year 2-7

2-4 GHG Inventory and Forecast Results by Jurisdiction and Year 2-20

3-1 Achieving Sonoma County's 2020 Greenhouse Gas Reduction Target—Summary 3-2

3-2 Greenhouse Gas Reduction Goals 3-9

3-3 Achieving Sonoma County's 2020 Greenhouse Gas Reduction Target 3-10

3-4 State Measures to Reduce Building Energy Emissions 3-12

3-5 State Measures to Reduce On-Road Transportation and Off-Road Equipment Emissions 3-13

3-6 Regional Measures to Reduce Building Energy Emissions 3-15

3-7 Regional Measures to Reduce On-Road Transportation and Off-Road Equipment Emissions 3-16

3-8 Regional Measures to Reduce Solid Waste Generation Emissions 3-18

3-9 Regional Measures to Reduce Water and Wastewater Emissions 3-19

3-10 Advanced Climate Initiative Measures 3-20

3-11 Local GHG Reduction Measures 3-24

4.2-1 Sample Process for RCPA Supported Implementation of Local Measures 4-9

4.2-2 Implementation Timeline for the GHG Reduction Measures 4-10

5.1-1 Cloverdale Socioeconomic Data 5-3

5.1-2 Cloverdale, County, and State 2010 Average Energy and Water Use 5-4

5.1-3 Cloverdale Community GHG Backcast, Inventory, and Forecasts 5-9

5.1-4 Cloverdale 2020 GHG BAU Emissions, Reductions, and CAP Emissions 5-10

5.1-5 Cloverdale 2020 GHG Emissions Reductions by Measure ........ 5-13

5.2-1 Cotati Socioeconomic Data ........ 5-18

5.2-2 Cotati, County, and State 2010 Average Energy and Water ........ 5-18

5.2-3 Cotati Community GHG Backcast, Inventory, and Forecasts ........ 5-25

5.2-4 Cotati 2020 GHG BAU Emissions, Reductions, and CAP Emissions ........ 5-26

5.2-5 Cotati 2020 GHG Emissions Reductions by Measure ........ 5-29

5.3-1 Healdsburg Socioeconomic Data ........ 5-35

5.3-2 Healdsburg, County, and State 2010 Average Energy and Water Use ........ 5-35

5.3-3 Healdsburg Community GHG Backcast, Inventory, and Forecasts ........ 5-42

5.3-4 Healdsburg 2020 GHG BAU Emissions, Reductions, and CAP Emissions ........ 5-43

5.3-5 Healdsburg 2020 GHG Emissions Reductions by Measure ........ 5-46

5.4-1 Petaluma Socioeconomic Data ........ 5-52

5.4-2 Petaluma, County, and State 2010 Average Energy and Water Use ........ 5-53

5.4-3 Petaluma Community GHG Backcast, Inventory, and Forecasts ........ 5-60

5.4-4 Petaluma 2020 GHG BAU Emissions, Reductions, and CAP Emissions ........ 5-61

5.4-5 Petaluma 2020 GHG Emissions Reductions by Measure ........ 5-64

5.5-1 Rohnert Park Socioeconomic Data ........ 5-70

5.5-2 Rohnert Park, County, and State 2010 Average Energy and Water Use ........ 5-70

5.5-3 Rohnert Park Community GHG Backcast, Inventory, and Forecasts ........ 5-77

5.5-4 Rohnert Park 2020 GHG BAU Emissions, Reductions, and CAP Emissions ........ 5-78

5.5-5 Rohnert Park 2020 GHG Emissions Reductions by Measure ........ 5-81

5.6-1 Santa Rosa Socioeconomic Data ........ 5-87

5.6-2 Santa Rosa, County, and State 2010 Average Energy and Water Use ........ 5-88

5.6-3 Santa Rosa Community GHG Inventory and Forecast ........ 5-92

5.6-4 Total Santa Rosa GHG Reduction Summary by Topic ........ 5-93

5.6-5 Santa Rosa GHG Emissions Reductions by Measure ........ 5-93

5.7-1 Sebastopol Socioeconomic Data ........ 5-103

5.7-2 Sebastopol, County, and State 2010 Average Energy and Water Use ........ 5-103

5.7-3 Sebastopol Community GHG Backcast, Inventory, and Forecasts .......... 5-107

5.7-4 Sebastopol 2020 GHG BAU Emissions, Reductions, and CAP Emissions .......... 5-108

5.7-5 Sebastopol 2020 GHG Emissions Reductions by Measure .......... 5-111

5.8-1 Sonoma Socioeconomic Data .......... 5-116

5.8-2 Sonoma, County, and State 2010 Average Energy and Water Use .......... 5-117

5.8-3 Sonoma Community GHG Backcast, Inventory, Forecasts .......... 5-125

5.8-4 Sonoma 2020 GHG BAU Emissions, Reductions, and CAP Emissions .......... 5-126

5.8-5 Sonoma 2020 GHG Emissions Reductions by Measure .......... 5-129

5.9-1 Windsor Socioeconomic Data .......... 5-135

5.9-2 Windsor, County, and State 2010 Average Energy and Water Use .......... 5-135

5.9-3 Windsor Community GHG Backcast, Inventory, and BAU Forecasts .......... 5-141

5.9-4 Windsor 2020 GHG BAU Emissions, Reductions, and CAP Emissions .......... 5-142

5.9-5 Windsor 2020 GHG Emissions Reductions by Measure .......... 5-145

5.10-1 Unincorporated County Socioeconomic Data .......... 5-151

5.10-2 Unincorporated County, Total County, and State 2010 Average Energy and Water Use .......... 5-151

5.10-3 Unincorporated Sonoma County Community GHG Backcast, Inventory, and Forecasts .......... 5-157

5.10-4 Unincorporated Sonoma County 2020 GHG BAU Emissions, Reductions, and CAP Emissions .......... 5-158

5.10-5 Unincorporated Sonoma County 2020 GHG Emissions Reductions by Measure .......... 5-161

6-1 Number of Times per Year When Maximum Temperature Is Projected to Exceed 95°F for 3 or More Consecutive Days in the Santa Rosa Plain .......... 6-5

6-2 Climate Change Effects on People and Social Systems .......... 6-11

6-3 Climate Change Effects on Built Systems .......... 6-12

6-4 Climate Change Effects on Natural and Working Lands .......... 6-14

6-5 Sample of Existing Local Efforts that Increase Resilience to Climate Change .......... 6-16

6-6 Climate Change Adaptation Goals and Opportunities .......... 6-17

# List of Figures

**Figures** **Page**

ES-1 Countywide GHG Inventory and Forecast Results by Source and Year ES-1

ES-2 Sonoma County Greenhouse Gas Emissions Pathways ES-4

1.2-1 Building Blocks of Climate Response 1-5

2-1 2010 Countywide GHG Emissions by GHG Source 2-5

2-2 Countywide GHG Inventory and Forecast Results by Source and Year 2-8

2-3 Building Emissions by Fuel 2-9

2-4 $CO_2$ Emissions Factor Comparison by Utility/Region 2-10

2-5 Comparison of PG&E and SCP 2014 Electric Power Generation Mixes 2-11

2-6 Building Energy Emissions by End Use 2-11

2-7 Sonoma County Daily Trips by Mode for 2010 2-12

2-8 Sonoma County Daily Trips by Purpose for 2010 2-13

2-9 Sonoma County Solid Waste Emissions by Waste Type for 2010 2-14

2-10 Sonoma County Water Supply by Source for 2010 2-15

2-11 Sonoma County Water Use by Sector for 2010 2-15

2-12 Sonoma County Wastewater Emissions by Source for 2010 2-16

2-13 Livestock and Fertilizer Emissions by Source 2-16

2-14 Manure Management Emissions by Livestock Type 2-17

2-15 Enteric Fermentation Emissions by Livestock Type 2-18

2-16 Total Fertilizer Emissions by Crop Type 2-19

2-17 Projection of land cover and carbon storage (CO2e) by cover class to 2050 2-23

3-1 Achieving Sonoma County's 2020 Greenhouse Gas Reduction Target 3-3

3-2 Sonoma County 1990 to 2050 GHG Emissions Pathways 3-4

3-3 Sonoma County Per-Capita Emission Targets from 1990 to 2050 3-5

4-1 Countywide 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions 4-2

4-2 Implementation Timeline for the GHG Reduction Measures ..... 4-10

5.1-1 Modes to Work in Cloverdale in 2010 ..... 5-4

5.1-2 Cloverdale 2010 Community GHG Inventory by Source ..... 5-7

5.1-3 Cloverdale 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions ..... 5-11

5.2-1 Modes to Work in Cotati in 2010 ..... 5-19

5.2-2 Cotati 2010 Community GHG Inventory by Source ..... 5-24

5.2-3 Cotati 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions ..... 5-27

5.3-1 Modes to Work in Healdsburg in 2010 ..... 5-36

5.3-2 Healdsburg 2010 Community GHG Inventory by Source ..... 5-40

5.3-3 Healdsburg 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions ..... 5-44

5.4-1 Modes to Work in Petaluma in 2010 ..... 5-54

5.4-2 Petaluma 2010 Community GHG Inventory by Source ..... 5-59

5.4-3 Petaluma 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions ..... 5-62

5.5-1 Modes to Work in Rohnert Park in 2010 ..... 5-71

5.5-2 Rohnert Park 2010 Community GHG Inventory by Source ..... 5-76

5.5-3 Rohnert Park 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions ..... 5-79

5.6-1 Modes to Work in Santa Rosa in 2010 ..... 5-88

5.6-2 Santa Rosa Community GHG Inventory by Source ..... 5-91

5.7-1 Modes to Work in Sebastopol in 2010 ..... 5-104

5.7-2 Sebastopol 2010 Community GHG Inventory by Source ..... 5-106

5.7-3 Sebastopol 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions ..... 5-109

5.8-1 Modes to Work in Sonoma in 2010 ..... 5-118

5.8-2 Sonoma 2010 Community GHG Inventory by Source ..... 5-123

5.8-3 Sonoma 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions ........ 5-127

5.9-1 Modes to Work in Windsor in 2010 ........ 5-136

5.9-2 Windsor 2010 Community GHG Inventory by Source ........ 5-140

5.9-3 Windsor 1990, 2010, and 2020 GHG Emissions; 2020 State, Regional, and Local Reductions ........ 5-143

5.10-1 Modes to Work in the Unincorporated County in 2010 ........ 5-152

5.10-2 Unincorporated Sonoma County 2010 Community GHG Inventory by Source ........ 5-156

5.10-3 Unincorporated Sonoma County 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions ........ 5-159

6-1 Future Climate Scenarios for Sonoma County ........ 6-2

6-2 Observed (1981–2010) and Projected Future Summer and Winter Temperature for Sonoma County ........ 6-4

6-3 Changes in Projected Fire Probability for Sonoma County ........ 6-6

6-4 Graph of Annual Precipitation Projected under Four Representative Climate Futures ........ 6-7

6-5 Areas at Risk of Flooding with 39 Inches of Sea-Level Rise in Southern Sonoma County ........ 6-8

6-6 Areas at Risk of Flooding with 39 Inches of Sea Level Rise near Bodega Bay ........ 6-9

6-7 Overall Climate Readiness Sequence for Sonoma County ........ 6-19

# List of Acronyms and Abbreviations

| | |
|---|---|
| °F | degrees Fahrenheit |
| AB | Assembly Bill |
| ARB | California Air Resources Board |
| B2B Project | City of Petaluma's Biomass-to-Biofuel Project |
| BAAQMD | Bay Area Air Quality Management District |
| BAU | business-as-usual |
| BCM | Basin Characterization Model |
| C&D | construction and demolition |
| CA2020 | Climate Action 2020 |
| CAP | Climate Action Plan |
| CCA | Community Choice Aggregation |
| CEC | California Energy Commission |
| CEQA | California Environmental Quality Act |
| $CH_4$ | methane |
| CNG | compressed natural gas |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalent |
| CPUC | California Public Utilities Commission |
| CWD | climatic water deficit |
| E3 | Energy + Environmental Economics |
| ESD | Energy and Sustainability Division |
| EV | electric vehicle |
| FOG | fats, oils and grease |
| GBO | Green Building Ordinance |
| GGE | gallons gas equivalent |
| GHG | greenhouse gas |
| GWP | Global Warming Potential |
| HSW | high strength waste |

| | |
|---|---|
| IPCC | International Panel on Climate Change |
| kWh | kilowatt hours |
| LCFS | Low-Carbon Fuel Standard |
| LED | light-emitting diode |
| $MMTCO_2e$ | million metric tons of carbon dioxide equivalent |
| MT | metric ton |
| MTC | Metropolitan Transportation Commission |
| $MTCO_2e$ | metric tons of carbon dioxide equivalent |
| MUP | Multi-Use Path |
| $N_2O$ | nitrous oxide |
| NBCAI | North Bay Climate Adaptation Initiative |
| NQ | not quantified |
| NSCAPCD | Northern Sonoma County Air Pollution Control District |
| PACE | Property Assessed Clean Energy |
| PAYS | Pay As You Save |
| PG&E | Pacific Gas & Electric Company |
| PPA | power purchase agreement |
| ppb | parts per billion |
| ppm | parts per million |
| ppt | parts per trillion |
| PV | photovoltaic |
| PWRPA | Power and Water Resources Pooling Authority |
| RCPA | Regional Climate Protection Authority |
| RMDZ | Recycling Market Development Zone Program |
| RPS | Renewable Portfolio Standard |
| SB | Senate Bill |
| SCADA | Supervisory Control and Data Acquisition |
| SCEIP | Sonoma County Energy Independence Program |
| SCEW | Sonoma County Energy Watch |
| SCP | Sonoma Clean Power |

| | |
|---|---|
| SCT | Sonoma County Transit |
| SCTA | Sonoma County Transportation Authority |
| SCWA | Sonoma County Water Agency |
| SCWMA | Sonoma County Waste Management Agency |
| SMART | Sonoma-Marin Area Rail Transit |
| SR | State Route |
| SSURGO | Soil Survey Geographic |
| SWG | Staff Working Group |
| TDM | Transportation Demand Management |
| TOD | transit-oriented development |
| TRO | trip reduction ordinance |
| UC | University of California |
| UGB | Urban Growth Boundary |
| VMT | vehicle miles traveled |
| WWTP | wastewater treatment plant |

# Glossary of Terms

**Assembly Bill (AB) 32.** Assembly Bill 32 is commonly known as the California Global Warming Solutions Act of 2006. The bill requires the California Air Resources Board to develop and enforce regulations for the reporting and verification of statewide greenhouse gas emissions and develop and implement measures to reduce greenhouse gas (GHG) measures. The heart of the bill is the requirement that statewide greenhouse gas emissions must be reduced to 1990 levels by the year 2020, or about 15% from today's levels.

**Assembly Bill 32 Scoping Plan (AB 32 Scoping Plan).** The AB 32 Scoping Plan outlines a range of greenhouse gas reduction actions for achieving the statewide emissions limit set forth by Assembly Bill 32. These strategies include direct regulations, compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. The Scoping Plan presently includes measures to meet the 2020 target in AB 32. The most recent update (in 2013) described potential measures to reduce GHG emissions out to 2020. Executive Order S-15-30 requires ARB to update the Scoping Plan to meet the 40% below 1990 level by 2030.

**Association of Bay Area Governments (ABAG).** ABAG was created by local governments to meet their planning and research needs related to land use, environmental and water resource protection, disaster resilience, energy efficiency, and hazardous waste mitigation and to provide risk management, financial services, and staff training to local counties, cities, and towns.

**Bay Area Air Quality Management District (BAAQMD).** The Bay Area Air Quality Management District is the local agency responsible for managing and regulating air quality in the San Francisco Bay Area. It is made up of nine counties in California: San Mateo, San Francisco, Santa Clara, Alameda, Contra Costa, Marin, Napa, and portions of Solano and Sonoma. The District establishes emissions limits and provides guidance for evaluating air quality and climate change impacts of new development projects.

**Bay Area Regional Energy Network (BAYREN).** BayREN is a collaboration of the 9 counties that make up the San Francisco Bay Area. Led by ABAG, BayREN implements effective energy-saving programs on a regional level and draws on the expertise, experience, and proven track record of Bay Area local governments to develop and administer successful climate, resource, and sustainability programs. BayREN is funded by California utility ratepayers under the auspices of the California Public Utilities Commission. One of only two Regional Energy Networks in the state, BayREN represents 20% of the state's population.

**Business-As-Usual (BAU).** Business-as-usual represents a future scenario that does not consider the possible reduction of greenhouse emissions that may result from any legislation or regulation that would go into effect after the baseline year. The business-as-usual projections are estimates of future emissions based on current energy and carbon intensity in the existing economy without considerations of any federal, state, or local reduction measures designed to reduce greenhouse gas emissions.

**California Department of Transportation (Caltrans).** Caltrans manages more than 50,000 miles of California's highway and freeway lanes, provides inter-city rail services, permits more than 400 public-use airports and special-use hospital heliports, and works with local agencies. Caltrans carries out its mission of providing a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability, with six primary programs: Aeronautics, Highway Transportation, Mass Transportation, Transportation Planning, Administration, and the Equipment Service Center.

**California Environmental Quality Act (CEQA).** The California Environmental Quality Act is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.

**CEQA Document.** Document required by the California Environmental Quality for all projects involving state or local agencies. The document discloses potential impacts that a proposed project may have on the natural and human environmental. Some projects are categorically or statutorily exempt. There are two classes of environmental documents: negative declarations, and environment impact reports.

**California Air Resources Board (ARB).** The California Air Resources Board is a part of the California Environmental Protection Agency. Its mission is to promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants, while recognizing and considering the effects on the economy of the state.

**California Energy Commission (CEC).** The California Energy Commission is the state's primary energy policy and planning agency. Established by the Legislature in 1974 and located in Sacramento, seven core responsibilities guide the Energy Commission as it sets California energy policy:

1. Forecasting future energy needs;
2. Promoting energy efficiency and conservation by setting the state's appliance and building energy efficiency standards;
3. Supporting energy research that advances energy science and technology through research, development and demonstration projects;
4. Developing renewable energy resources;
5. Advancing alternative and renewable transportation fuels and technologies;
6. Certifying thermal power plants 50 megawatts and larger; and
7. Planning for and directing state response to energy emergencies.

**California Public Utilities Commission (CPUC).** CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. CPUC serves the public interest by protecting consumers and ensuring the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy. CPUC regulates utility services, stimulates innovation, and promotes competitive markets, where possible.

**Carbon Dioxide Equivalents (CO2e).** A measure for quantifying the potential impact a greenhouse gas may have on global warming using the functionally equivalent amount or concentration of carbon dioxide as a reference.

**Carbon Sequestration.** Carbon sequestration is the process of increasing the carbon content of a reservoir other than the atmosphere.

**Center for Climate Protection (CPC).** Formerly known as the Climate Protection Campaign, the Center for Climate Protection's mission is to inspire, align, and mobilize action in response to the climate crisis. The Center for Climate Protection works with business, government, youth and the broader community to advance practical, science-based solutions for significant greenhouse gas emission reductions.

**Community Choice Aggregation (CCA).** CCA is a policy that enables local governments to aggregate electricity demand within their jurisdictions in order to procure alternative energy supplies while maintaining the existing electricity provider for transmission and distribution services.

**Community Climate Action Plan (CAP).** A community Climate Action Plan quantifies greenhouse emissions within a jurisdiction and outlines strategies for mitigating and avoiding future emissions under the influence of the local jurisdiction. In order for a CAP to qualify for tiering under State CEQA Guidelines Section 15185, it must be adopted through a public process and include a monitoring and reporting protocol.

**Community Inventory.** The community inventory includes greenhouse gas emissions occurring in association with the land uses within a jurisdictional boundary, and generally consists of sources of emissions that a community can influence or control. The inventory includes emissions that occur inside and outside the jurisdictional boundary, but only to the extent that such emissions are due to land uses within the jurisdiction.

**County of Sonoma Energy and Sustainability Division (ESD).** ESD is responsible for the planning, evaluating and administering the countywide Energy Management and Sustainability Program. Services include long- and short-range energy and green procurement strategies, effective and efficient energy use and sustainability practices, and County employee commute reduction planning.

**County of Sonoma Permit & Resource Management Department (PRMD).** PRMD's mission is to serve the people of Sonoma County by providing a customer-focused process for the orderly development of real property, balanced with resource stewardship under the general policy direction of the Board of Supervisors, and to develop and maintain standards that protect the health and safety of the public.

**County of Sonoma Agricultural Preservation & Open Space District.** County department that uses a sales tax for the purchase of conservation easements to protect agricultural lands and preserve open space.

**Cost Effectiveness Analysis.** The cost effectiveness analysis examines the costs and savings of implementing individual greenhouse gas reduction measures. The analysis can assist jurisdictions in evaluating the financial requirements of a climate action plan. The analysis can also outline co-benefits and uncover additional consequences of implementing a particular reduction measure.

**Global Warming.** Global warming is a phenomenon created by rising atmospheric concentrations of GHGs in excess of natural levels. The additional GHG concentrations exacerbate the natural greenhouse gas effect (see below), resulting in increasing global surface temperatures.

**Global Warming Potential (GWP).** The Global Warming Potential, or GWP, is used to compare GHGs based on their potential to trap heat and remain in the atmosphere. Some gases can absorb more heat than others and thus have a greater impact on global warming. For example, CO2 is considered to have a GWP of 1, whereas N2O has a GWP of 265. This means that N2O is 265 times more powerful than CO2.

**Emissions Type.** Greenhouse gas emissions can be defined as either direct (emissions that occur at the end use location, such as natural gas combustion for building heating) or indirect (emissions that result from consumption at the end use location but occur at another location, such as emissions that occur at the power plant itself but result from residential electricity use of in‐home appliances or other uses). The climate action plan addresses both types of emissions.

**Greenhouse Gas (GHG).** Greenhouse gases trap longwave infrared radiation emitted from the earth's surface, which would otherwise escape to space. This fundament process causes the greenhouse gas effect. The primary greenhouse gases include water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), halogenated chlorofluorocarbons (HCFCs), ozone (O3), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs).

**Greenhouse Gas Effect.** The greenhouse gas effect keeps the atmosphere near the Earth's surface warm enough for the successful habitation of humans and other life forms. It is created by sunlight that passes through the atmosphere, some of which is absorbed by the Earth and converted to heat, which warms the surface.

**Greenhouse Gas Emissions Inventory.** A greenhouse gas inventory is a quantification of greenhouse gas emissions and sinks within a selected physical and/or economic boundary over a specified time. Greenhouse gas inventories can be performed on a large scale (i.e., for global and national entities) or on a small scale (i.e., for a particular building or person).

**Greenhouse Gas Emissions Reduction Goal.** The greenhouse gas emissions reduction goal identifies a target for reducing greenhouse gas emissions by a particular date. For example, the California statewide emissions reduction goal is 1990 emissions levels by 2020.

**High Global Warming Potential (GWP) GHGs.** High global warming potential GHGs are primarily composed of three types of gases: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). These compounds are the most potent greenhouse gases and typically have extremely long atmospheric lifetimes, resulting in irreversible accumulation in the atmosphere once emitted.

**Intergovernmental Panel on Climate Change (IPCC).** The Intergovernmental Panel on Climate Change is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). Its primary function is to review and assess the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. The Intergovernmental Panel on Climate Change does not conduct any research nor does it monitor climate related data or parameters.

**Metropolitan Transportation Commission (MTC).** Created by the state Legislature in 1970, MTC is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area. Over the years, the agency’s scope has grown, and it is now three agencies in one, functioning as MTC as well as the Bay Area Toll Authority (BATA) and the Service Authority for Freeways and Expressways (SAFE).

**National Resources Conservation Service (NRCS).** NRCS helps America’s farmers, ranchers, and forest landowners conserve the nation’s soil, water, air, and other natural resources. All programs are voluntary and offer science-based solutions that benefit both the landowner and the environment.

**North Bay Climate Adaptation Initiative (NCBAI).** NBCAI is a coalition of natural resource managers, policy makers, and scientists committed to working together to create positive solutions to the problem of climate adaptation for the ecosystems and watersheds of Sonoma County. NBCAI implements effective climate adaptation strategies that sustain ecological and human communities of North San Francisco Bay watersheds. NBCAI’s vision is that the San Francisco North Bay has resilient, biologically diverse natural systems that provide lasting ecosystem functions and services.

**Northern Sonoma County Air Pollution Control District (NSCAPCD).** The Northern Sonoma Air Pollution Control District is the local agency responsible for managing and regulating air quality in the northern and western parts of Sonoma County. The NSCAPCD establishes emissions limits and provides guidance for evaluating air quality and climate change impacts of new development projects.

**Property Assessed Clean Energy (PACE).** The PACE finance program is intended to finance energy and water improvements within a home or business through a land-secured financing, and funds are repaid through property assessments. Municipalities are authorized to designate areas where property owners can enter into contractual assessments to receive long-term, low-interest financing for energy and water efficiency improvements and renewable energy installation on their property.

**Pacific Gas & Electric Company (PG&E).** PG&E is a utility providing electricity and natural gas service to Sonoma County. The company delivers natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California.

**Regional.** This plan uses the term regional to refer to the county-wide approach that Sonoma County will use to reduce greenhouse gas emissions, except where noted. Regional entities are cross-jurisdictional agencies that can provide some services and resources on behalf of communities in the county, more efficiently than individual communities can on their own. Regional entities and programs may be operating through the county, but may not cover each jurisdiction. This plan highlights the approach that, by working together through regional initiatives, goals, and targets, Sonoma County's communities can achieve greater GHG reductions, and do it more efficiently than if each city and County acted on their own.

**Regional Climate Protection Authority (RCPA).** The Regional Climate Protection Authority was created in 2009 to improve coordination on climate change issues and establish a clearinghouse for efforts to reduce greenhouse gas emissions. The agency is made up of the same Board of Directors as the Sonoma County Transportation Agency and includes representatives from each of the nine cities in Sonoma County and the Board of Supervisors.

**Regional Targets Advisory Committee (RTAC) "accounting rules".** The Regional Targets Advisory Committee was established to provide recommendations on factors to be considered and methodologies to be used in the target setting process, as required under Senate Bill 375. One of the "accounting rules" refer to a method for accounting the three following types of vehicle trips: 1) trips that originated and terminated within a jurisdiction; 2) trips that either originated or terminated (but not both) within a jurisdiction; and 3) trips that neither originated nor terminated within a jurisdiction. The "accounting rules" specify that trips of type 1, 2, and 3 should be waited by 1, 0.5, and 0 respectively when developing estimates of jurisdiction-generated vehicle miles traveled.

**Sonoma Resource Conservation District (Sonoma RCD).** The Sonoma RCD is a grassroots conservation delivery system that identifies local conservation problems and guides solutions on a voluntary basis. The Sonoma RCD covers 919,000 acres, or over 85% of Sonoma County, and includes the Russian River, Petaluma River, Sonoma Creek, Stemple Creek, and Gualala River Watersheds.

**Sonoma Clean Power (SCP).** SCP is official electricity provider in Sonoma County, providing cleaner power at a competitive price from sources like solar, wind, geothermal and hydropower. SCP is a community choice aggregation non-for-profit agency, independently run by Sonoma County and the participating cities of Cloverdale, Cotati, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, unincorporated Sonoma County and the Town of Windsor. SCP will be the lead for seeking to increase the renewable portfolio for electricity generated to serve the county. As SCP gathers momentum and capacity, the members will fund local energy efficiency programs as well as local renewables for CleanStart and EverGreen revenue.

**Sonoma County Energy Independence Program (SCEIP).** SCEIP is a County of Sonoma Energy and Sustainability Division program that serves county residents and businesses as a central clearinghouse of information about energy efficiency, water conservation, and renewable energy generation. The program is designed to assist property owners and tenants find the information, resources, rebates, contractors, and financing that fits their situation.

**Sonoma County Energy Watch (SCEW).** SCEW is a local government partnership between the County of Sonoma and PG&E designed to help save money and energy while reducing harmful impacts on the climate. SCEW provides energy efficiency services to local governments, nonprofit organizations, small businesses, and special districts in the County of Sonoma who are served by either PG&E or Sonoma Clean Power.

**Sonoma County Transportation Authority (SCTA).** The Sonoma County Transportation Authority serves as the coordinating and advocacy agency for transportation funding for Sonoma County. The SCTA prioritizes, coordinates, and maximizes funding available for transportation projects and provides comprehensive, county-wide planning.

**Sonoma County Winegrowers (SCW).** The Sonoma County Winegrape Commission, also known as Sonoma County Winegrowers (SCW), was established in 2006 as a marketing and educational organization dedicated to the promotion and preservation of Sonoma County as one of the world’s premier grape growing regions. SCW has oversight by California Department of Food and Agriculture, which supports producer regions. With more than 1,800 growers, SCW’s goal is to increase awareness and recognition of the quality and diversity of Sonoma County’s grapes and wines through dynamic marketing and educational programs targeted to wine consumers around the world.

**Sonoma County Water Agency (SCWA).** The mission of the Sonoma County Water Agency is to effectively manage water resources for the benefit of people and the environment through resource and environmental stewardship, technical innovation, and responsible fiscal management. SCWA provides an array of services including, but not limited to, naturally filtered drinking water, flood protection services, distribution of recycled water, recreational opportunities, and wastewater treatment.

**Sonoma County Waste Management Authority (SCWMA).** The Sonoma County Waste Management Agency is a joint powers authority whose mission is to implement waste diversion programs as required by state law AB 939. SCWMA informs local residents and businesses of ways they can help reduce, reuse, and recycle their solid waste and properly dispose of hazardous materials.

**Sustainable Communities Strategy (SCS).** Under the Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008), ARB sets regional targets for GHG emissions reductions from passenger vehicle use. In 2010, ARB established these targets for 2020 and 2035 for each region covered by one of the state's metropolitan planning organizations (MPO).

Each of California's MPOs must prepare a sustainable communities strategy as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets. Once adopted by the MPO, the RTP/SCS guides the transportation policies and investments for the region.

**Sonoma-Marin Area Rail Transit (SMART).** Sonoma-Marin Area Rail Transit (SMART) is a passenger train and bicycle & pedestrian pathway project located in San Francisco's North Bay. SMART will provide rail service along 70 miles of the historic Northwestern Pacific Railroad alignment, connecting urban and rural residents of the two counties with jobs, education, and health care services in the region. The project revives the long-dormant but publicly owned railroad right-of-way, serving stations from Cloverdale in Sonoma County to the San Francisco-bound ferry terminal in Larkspur, Marin County.

**Vehicle Miles Traveled (VMT).** Total miles travelled on roads and highways by motor vehicles in a particular jurisdiction.

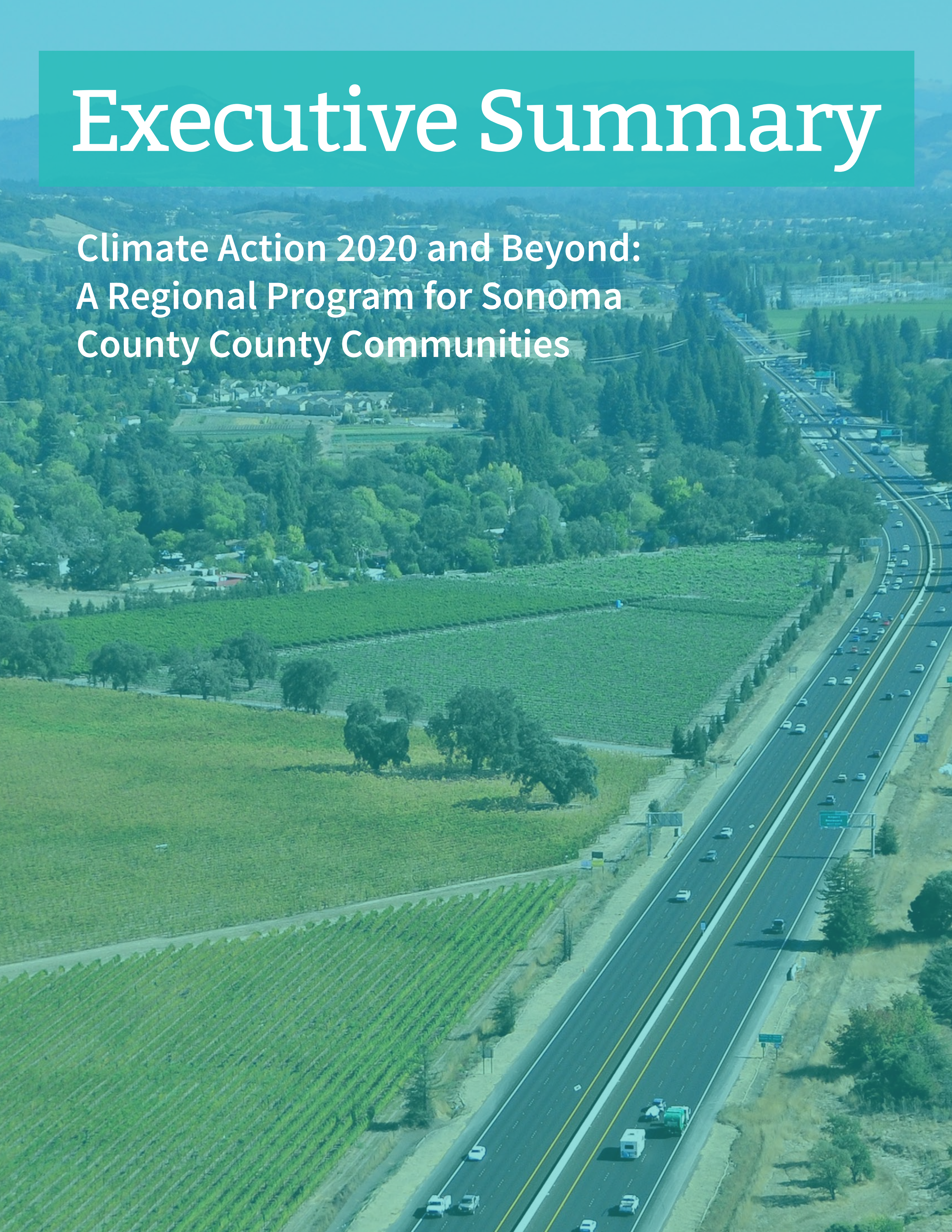
**Waste-To-Energy (WTE).** WTE is the process of generating energy in the form of electricity and/or heat from the primary treatment of waste. WTE is a form of energy recovery. Most WTE processes produce electricity and/or heat directly through combustion, or produce a combustible fuel commodity, such as methane, methanol, ethanol, or synthetic fuels.

**U.S. Environmental Protection Agency (USEPA).** The mission of the USEPA is to protect human health and the environment by developing and enforcing regulations. The USEPA also gives grants to state environmental programs, non-profits, educational institutions, and others; studies environmental issues; and provides education on the environment.

**Zero Net Energy.** A zero net energy (ZNE) building is a building with zero net energy consumption, meaning the total amount of energy used by the building on an annual basis is roughly equal to the amount of renewable energy created on the site. These buildings consequently do not increase the amount of greenhouse gases in the atmosphere.

# Executive Summary

## Climate Action 2020 and Beyond: A Regional Program for Sonoma County County Communities



# Executive Summary

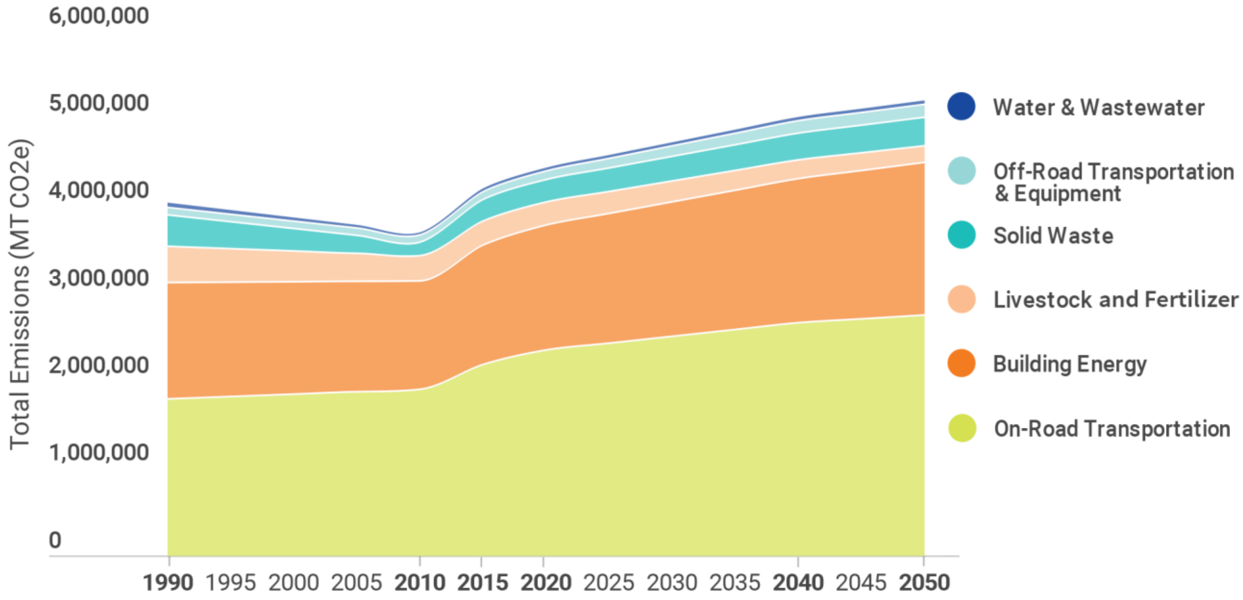
## ES.1 Introduction

**Human-induced climate change is a global challenge that demands action at every level, including local government.** Sonoma County communities are established leaders in locally-based efforts to combat global climate change, and this Regional Climate Action Plan (CAP) takes another step forward as local governments and regional agencies commit to concrete actions that will further reduce countywide Greenhouse Gas (GHG) emissions and create a better future for Sonoma County.

## ES.2 A Call to Action: Climate Change is a Serious Threat, But We Know What to Do

Given the magnitude of human-induced climate change and the projected catastrophic effects from continued global warming, reducing GHG emissions has become an environmental and societal imperative. This CAP is needed because, despite local and state leadership, GHG emissions in Sonoma County will continue to grow without additional action. The chart below shows how emissions from various GHG sources are forecast to increase if a "business-as-usual" approach is taken.

**Figure ES-1. Countywide GHG Inventory and Forecast Results by Source and Year[1]**



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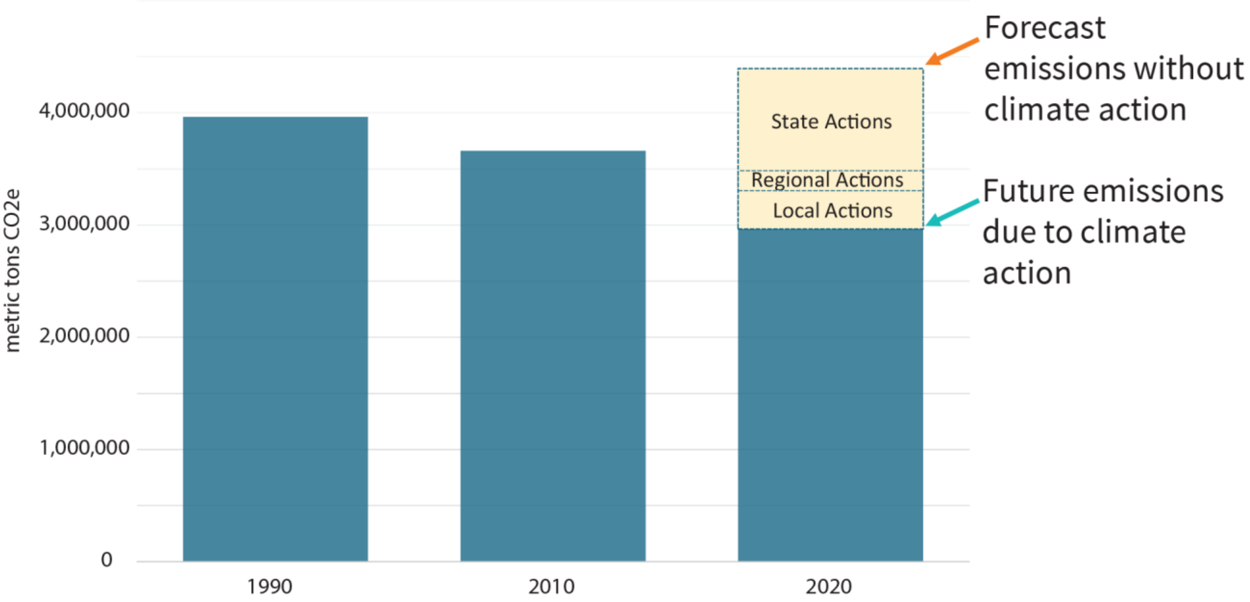
[1] The 1990 emissions in this chart include Santa Rosa's total 1990 emissions apportioned to each source using the 2010 inventory source distribution for the city (actual 1990 emissions by source are not available).

*Climate Action 2020* begins a new phase of local climate action by focusing on near-term actions that will be implemented through 2020 to achieve a 25% reduction in countywide GHG emissions (compared to 1990 levels). The figure below shows 1990 emissions (known as a "backcast"), emissions from the 2010 inventory, and projected GHG increases if no action is taken (BAU), as well as the GHG reduction target under this CAP.



This CAP builds on earlier efforts to chart a future that will dramatically reduce countywide GHG emissions. These earlier efforts include the State of California's adoption of AB 32 (2006), which requires statewide GHG emissions to be reduced to 1990 levels by 2020, and more recent executive orders that target even deeper GHG reductions in the future. Here in Sonoma County, community leaders and forward-thinking elected officials throughout Sonoma County worked together to adopt an ambitious GHG reduction target in 2005 and to create the nation's first Regional Climate Protection Authority (RCPA), to coordinate countywide efforts to reduce GHG emissions. In 2008, a local non-profit, the Center Climate Protection (then called the Climate Protection Campaign) developed the *Sonoma County Community Climate Action Plan* to help inspire and guide local efforts.

In addition, the City of Santa Rosa adopted a Community Climate Action Plan in 2012 and a Municipal Climate Action Plan in 2013. These plans are referenced in this CAP, and their implementation will contribute substantially to regional GHG reductions. Although this CAP does not contain a chapter focused on Santa Rosa, data in the CAP include Santa Rosa to provide a county-wide picture and measure of future needed action.

Sonoma County's regional GHG reduction target will be met by combining the new actions described in this CAP with ongoing efforts already underway to accomplish the following 20 goals, grouped together by GHG source:

| Source | Key | Goals |
|---|---|---|
| ***Building Energy*** |  | 1. Increase building energy efficiency<br>2. Increase renewable energy use<br>3. Switch equipment from fossil fuel to electricity |
| ***Transportation & Land Use*** |  | 4. Reduce travel demand through focused growth<br>5. Encourage a shift toward low-carbon transportation options<br>6. Increase vehicle and equipment fuel efficiency<br>7. Encourage a shift toward low-carbon fuels in vehicles and equipment<br>8. Reduce idling |
| ***Solid Waste*** |  | 9. Increase solid waste diversion<br>10. Increase capture and use of methane from landfills |
| ***Water & Wastewater*** |  | 11. Reduce water consumption<br>12. Increase recycled water and greywater use<br>13. Increase water and wastewater infrastructure efficiency<br>14. Increase use of renewable energy in water and wastewater systems |
| ***Livestock & Fertilizer*** |  | 15. Reduce emissions from livestock operations<br>16. Reduce emissions from fertilizer use |
| ***Advanced Climate Initiatives*** |  | 17. Protect and enhance the value of open and working lands<br>18. Promote sustainable agriculture<br>19. Increase carbon sequestration<br>20. Reduce emissions from consumption of goods and services, including food |

# ES.3 A Regional Approach to Reducing GHG Emissions

If ever an issue called for coordinated, multi-partner effort, it is climate change; progress depends on Sonoma County communities working together. Although state programs will be essential to meeting Sonoma County’s GHG reduction goal, long-term regional collaboration will be needed to meet long-term goals. A regional GHG reduction goal—as opposed to individual goals for each jurisdiction—recognizes the shared nature of the challenge as well as the fact that Sonoma County communities each have a different capacity to achieve GHG reductions. This CAP identifies 14 GHG reduction measures for local agency implementation. Each city and the County selected the specific measures to include in their jurisdiction’s commitments.

This CAP also includes GHG reduction measures that will be implemented by regional entities that can provide some services and resources on behalf of *all* communities more efficiently than the individual jurisdictions can on their own, especially the smaller cities. Examples include the RCPA and Sonoma Clean Power, which provides affordable electricity with low carbon content.

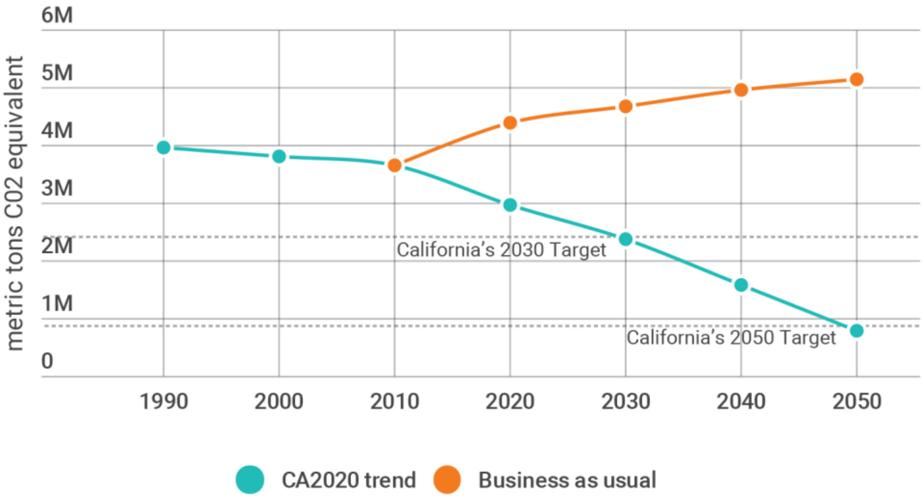
## ES.4 Putting This Climate Action Plan to Work

Through this CAP, Sonoma County communities have set an ambitious target for GHG emissions reduction, one that will require decisive and timely action by the local partners. The RCPA will coordinate and facilitate implementation actions by the cities and the county, and regional agencies. Each city and the county will develop its own implementation team for the actions that will occur at the local government level.

**Monitoring and Adaptive Management.** To ensure that GHG reduction efforts are effective and to adapt to changing technologies, regulations, and community behavior, the CAP calls for ongoing monitoring and adaptive management. Two interim GHG emissions inventories will be completed before 2020 and the RCPA Board will conduct a mid-course review to identify changes or plan amendments that may be needed to stay on-target. Equally important, the results of the interim inventories and the mid-course review will be reported to the community.

This CAP is one part of a much longer term GHG reduction effort. Even with the ambitious GHG reduction goal in this CAP, further actions will be needed to meet longer-term goals. Thus, in adopting this CAP, the RCPA will also adopt goals to reduce GHG emissions by 40% (compared to 1990) by 2030, and by 80% by 2050, which will necessitate another phase of climate action planning after 2020. The good news is that the actions in this CAP will put the county on a solid trajectory for achieving the longer term goals.

**Figure ES-2. Sonoma County Greenhouse Gas Emissions Pathways**



## ES.5 How Will This Plan Help Sonoma County Residents and Businesses?

**Reducing GHG Emissions is Good Business.** Reducing GHG emissions will save money for Sonoma County residents and business owners. Weatherizing or adding solar to existing homes, for example, creates construction jobs and cuts residents' utility bills. When businesses increase energy efficiency or add on-site renewable energy generation, they reduce operating costs and employ electricians, engineers, builders and plumbers. Sonoma County businesses are already exporting the products and services they develop to respond to climate change. For example, Enphase Energy is a local business that designs and manufactures micro-inverters for solar photovoltaic systems. As the world moves to a low-carbon economy and invests in climate-ready communities, Sonoma County businesses will reap the rewards of their leadership.

**Reducing GHG Emissions Supports Other Community Goals (Co-benefits).** Implementing the CAP will result in environmental and community co-benefits that go beyond GHG emissions reductions. For example, many of the actions will improve public health by reducing air pollutants like ozone, carbon monoxide, and fine particulates. Reduction measures focused on reducing energy use in transportation and building energy can help lessen the impact of future energy cost increases.

**Climate Action is Essential Risk Management.** Even with strong action to reduce GHG emissions, climate-related changes to natural and human systems cannot be avoided entirely. Sonoma County is already experiencing some of these effects, including higher temperatures and more variable rainfall. In response, this CAP also establishes goals for improving climate resilience in three key community resource areas: people and social systems; built systems; and natural and working lands. Many of the strategies to reduce emissions will also help strengthen climate resilience too.

The measures in this CAP provide an opportunity to reduce carbon emissions and achieve a diverse range of community co-benefits, identified in the plan with these icons:

Energy Savings
Air Quality Improvements
Public Health Improvements
Job Creation
Equity
Resource Conservation
Cost Savings
Climate Resilience

## ES.6 How Can Sonoma County Residents Help?

**Learn about your household carbon footprint.** The everyday activities of Sonoma County residents result in GHG emissions, including driving a vehicle, using fossil fuels to light and heat homes, and throwing away household garbage. This CAP focuses on actions that will be taken by cities and the County. Residents can help by supporting local adoption of these actions and participating in the programs that will result from this CAP (see below). In addition to municipal programs, residents can also learn about their household carbon footprint and ways to reduce GHG emissions through their own actions – such as driving an electric vehicle, installing solar or buying electricity from Sonoma Clean Power.

**Participate in programs to reduce local emissions.** The good news is that while human activities are a major climate change driver, we can also be part of the solution. Sonoma County residents can make impactful choices and changes in their daily lives such as changing lightbulbs to CFLs or LEDs, sealing and insulating their homes, replacing their lawn with drought tolerant plants, reusing and/or recycling materials that might otherwise be thrown away, and using water more efficiently. Residents can also choose to buy items made from local, renewable materials and make other low-carbon lifestyle choices, such as walking or biking, using public transportation, or eating less meat and more local vegetables. This CAP identifies some of the resources available to Sonoma County residents to help make these changes.

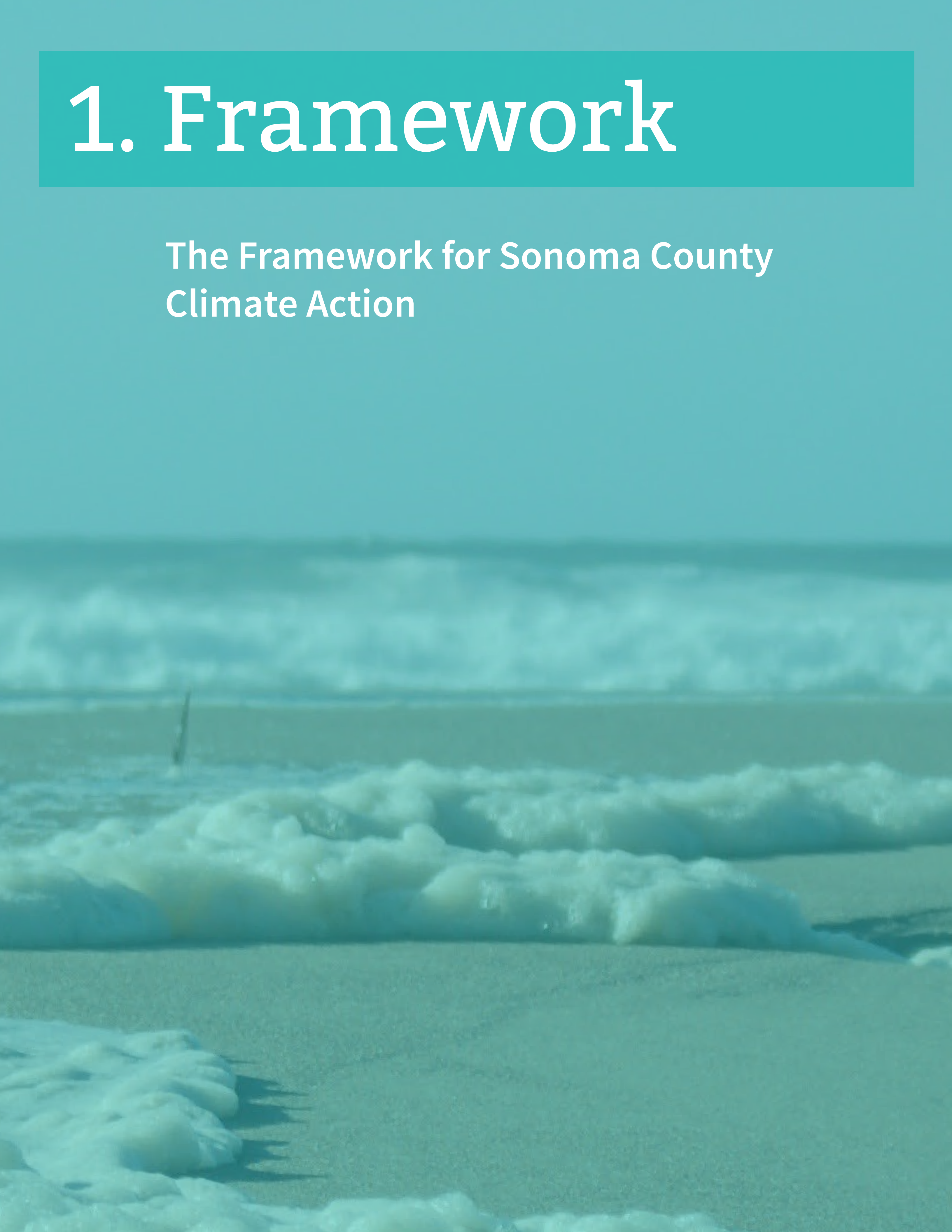
## ES.7 Public Outreach and Community Engagement

This CAP was prepared with input from community members, elected officials, and staff from the partner agencies. Ten open house-style public workshops were held, including one in each city. These meetings solicited public input on the types of reduction measures that should be included in the CAP. The role of local governments in addressing climate change and reducing GHG emissions was also discussed. The community dialogue that has begun with preparation of this plan will continue throughout implementation of the GHG emissions reduction measures.

To help guide the CAP development process, the RCPA board of directors also selected a Stakeholder Advisory Group to represent a diversity of viewpoints and technical expertise from each jurisdiction. Three representatives from each city and two representatives from each county supervisorial district were selected; some representatives had input from city councils, though none were elected officials themselves. The Group met five times at key milestones during the project. All meetings were open to the public and each meeting included an opportunity for the public to provide comments.

# 1. Framework

## The Framework for Sonoma County Climate Action



# Chapter 1
# The Framework for Sonoma County Climate Action

## 1.1 Introduction

**Human-induced climate change is a global challenge that demands action at every level, including local government.** Sonoma County communities are established leaders in locally based efforts to combat global climate change, and this Climate Action Plan takes another step forward as local governments and regional agencies commit to concrete actions that will further reduce countywide greenhouse gas (GHG) emissions and create a better future for Sonoma County. These local actions will combine with state and regional actions to reduce community GHG emissions to 25% below 1990 levels by 2020 and make substantial progress toward even greater reductions beyond 2020. These local actions will also advance many other community priorities such as economic resilience, public health, water efficiency, air quality, and overall quality of life.

## 1.2 A Call to Action

### 1.2.1 Climate Change Is a Serious Threat, But We Know What to Do

Sonoma County has long recognized the need for local action to help meet the global challenge of climate change. In 2008, the Climate Protection Campaign (now called the Center for Climate Protection) released the *Sonoma County Community Climate Action Plan* (also known as *Coolplan*), which outlined a package of solutions to meet a bold greenhouse gas (GHG) reduction target – 25% below 1990 levels by 2015. The plan was developed with the participation and support from local government, business, and community groups. Although *Coolplan* itself was not formally adopted, all nine cities and the County embraced the plan's ambitious GHG reduction goal and local leaders took initial actions that have made real progress toward reducing countywide GHG emissions, including programs like Sonoma Clean Power (SCP) and the Sonoma County Energy Independence Program. *Climate Action 2020* (CA2020) begins a new phase of local climate action by updating the countywide GHG reduction goal and focusing on near-term actions that will be implemented through 2020. These actions will substantially reduce emissions in the short term and put Sonoma County on a solid trajectory to achieve deeper GHG reductions that will be needed to meet the goal of reducing emissions 40% by 2030 and 80% by 2050. After 2020, another phase of local climate action planning will be needed to continue and expand the actions in CA2020 and to explore new strategies to meet longer-term GHG reduction goals.

## Climate Change Science: A Primer

Although changes in global climate have been recorded throughout history, there is strong consensus among the scientific community that recent changes are the result of GHG emissions created by the burning of fossil fuels and other human activity. The International Panel on Climate Change (IPCC), in its 2014 assessment, observed that human influence on the climate system is clear, and recent increases in GHGs emissions are the highest in history. Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850.

According to the IPCC:

> Anthropogenic (man-made) greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane ($CH_4$), and nitrous oxide ($N_2O$) that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century.

Even a relatively small increase in global temperatures can dramatically affect human and natural systems. According to the IPCC, "an increase in the global average temperature of 2°C (3.6°F) above pre-industrial levels, which is only 1.1°C (2.0°F) above present levels, poses severe risks to natural systems and human health and wellbeing." The warming climate is directly related to the amount of GHG in the atmosphere, typically expressed in terms of parts per million (ppm) of carbon dioxide equivalent ($CO_2e$). Many have called for stabilizing atmospheric GHG concentrations at 450 ppm $CO_2e$ (California Air Resources Board 2014b). However, with GHG concentrations now at or above 479 ppm $CO_2e$, natural systems and human health and wellbeing are already at high risk (National Oceanic and Atmospheric Administration 2014). Here in Sonoma County, those risks include increased flooding, wild land fires, and economic disruption.

To have an even chance of stabilizing GHG concentrations at 450 ppm $CO_2e$, global GHG emissions would have to decline by about 50% (compared with 2000 levels) by 2050. Given a more limited capacity to reduce emissions in developing countries, stabilizing at 450 ppm $CO_2e$ will require industrialized countries, including the United States, to reduce their emissions by approximately 80% below 1990 levels by 2050.

Strong action is needed to avoid serious damage to human wellbeing and natural systems. Individuals and communities need to determine how much and how fast they are willing to change energy use and implement other actions to achieve long-term GHG reductions.

Discussions about human-induced climate change often focus on the role of carbon. This is because carbon dioxide ($CO_2$) is the primary GHG emitted through human activities and accounts for about 82% of all U.S. GHG emissions. Therefore, terms like "atmospheric carbon," "carbon-neutral," or "low-carbon" are often heard in climate change discussions. However, human influence on the climate is actually driven by six primary gases, including $CO_2$. These gases each have different potential to trap heat and remain in the atmosphere (expressed as Global Warming Potential, or GWP). For example, whereas $CO_2$ has a GWP of 1, nitrous oxide ($N_2O$) has a GWP of

265. This means that, pound for pound, $N_2O$ is 265 times more powerful as a global warming agent than $CO_2$. But because there are far more $CO_2$ emissions than $N_2O$ emissions, $CO_2$ is still the greatest GHG concern overall. See Table 1.2-1 for a comparison of global warming potential from the six GHG gases.

**Table 1.2-1. Principal GHG Emissions**

| Greenhouse Gas | Primary Emissions Sources | Global Warming Potential (GWP)[a] | Atmospheric Lifetime (years) | Atmospheric Abundance |
|---|---|---|---|---|
| Carbon Dioxide ($CO_2$) | Burning of fossil fuels<br>Gas flaring<br>Cement production<br>Land use changes (reducing the amount of forested land or vegetated areas)<br>Deforestation | 1 | 50–200 | 394 ppm |
| Methane ($CH_4$) | Agricultural practices<br>Natural gas combustion<br>Landfill outgassing | 28 | 12.4 | 1,893 ppb |
| Nitrous Oxide ($N_2O$) | Agricultural practices<br>Nylon production<br>Gas-fired power plant operations<br>Nitric acid production<br>Vehicle emissions | 265 | 121 | 326 ppb |
| Perfluorinated Carbons ($CF_4$, $C_2F_6$) | Aluminum production<br>Semiconductor manufacturing | 6,630–11,100 | 10,000–50,000 | 4.2–79.0 ppt |
| Sulfur Hexafluoride ($SF_6$) | Power distribution<br>Semiconductor manufacturing<br>Magnesium processing | 23,500 | 3,200 | 7.8 ppt |
| Hydrofluorocarbons (HFC-23, HFC-134a, HFC-152a) | Consumer products (aerosol sprays, such as air fresheners, deodorants, hair products, etc.)<br>Automobile air-conditioners<br>Refrigerants | 138–12,400 | 1.5–222 | 3.9–75 ppt |

Notes:

[a] GWPs listed here are 100-year values without carbon-climate feedbacks.

ppm = parts per million

ppb = parts per billion

ppt = parts per trillion

Sources: Intergovernmental Panel on Climate Change 2013; Blasing 2014.

To provide a consistent framework, GHG emissions are usually quantified in terms of metric tons (MT) of $CO_2e$ per year, which accounts for the relative warming capacity of each gas. All GHGs in the emissions inventory and reduction measures are presented in terms of $MTCO_2e$. For more information on the latest climate science and IPCC research, visit http://www.ipcc.ch.

### Sonoma County Must Reduce Greenhouse Gas Emissions

Based on projections from the 2010 GHG inventory, Sonoma County is not expected to meet the 2015 goal of 25% below 1990 levels. Furthermore, the county's population is projected to increase by 5% between 2010 and 2020, and employment is projected to increase by 13% over the same period. Population and economic growth are the main factors influencing the growth of GHG emissions.

**Simply put, without additional actions, GHG emissions in 2020 and beyond will not be reduced and could increase because of continued population and economic growth.** Therefore, the primary goal of CA2020 is to grow smarter by ***reducing*** countywide GHG emissions to a level that is 25% below 1990 emissions by 2020, a target that is well beyond that established in current state law (Assembly Bill 32; see discussion of state regulatory framework in Section 1.2.2, below). This target will be met by combining the new actions described in this Climate Action Plan (CAP) with ongoing efforts already underway and working to achieve reductions in a thoughtful and coordinated manner.

In addition to the near-term emission-reduction goal for 2020, CA2020 also includes longer-term goals of reducing emissions by 40% (compared to 1990) by 2030 and by 80% by 2050, which will necessitate another phase of local climate action planning and implementation after 2020. Although the measures contained in this CAP will endure and continue to reduce emissions beyond 2020, even greater effort will be needed to reach the goals for 2030 and 2050. Specific actions needed after 2020 will be heavily influenced by the changes in technology, regulatory mandates, and behavior that will inevitably occur by 2020. An update to CA2020 is therefore included in the implementation plan.

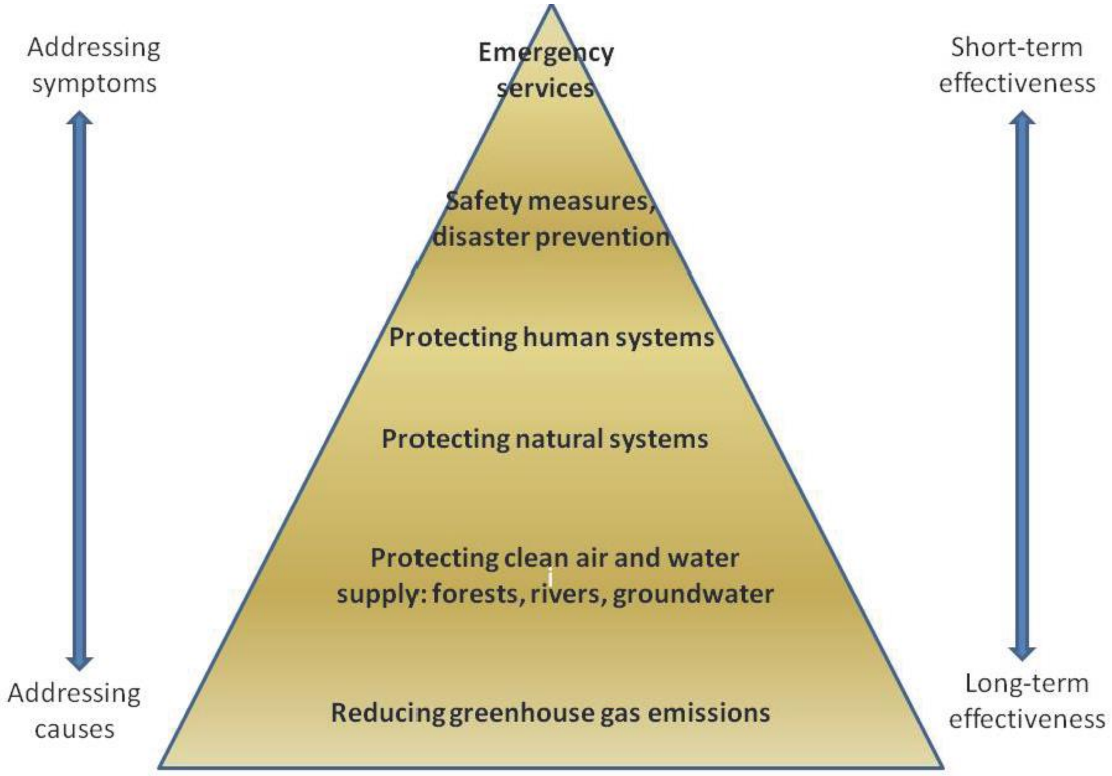
### Adapting to Climate Change and Building Resilient Communities

Actions taken to reduce GHG emissions are commonly referred to as *climate mitigation* and are the foundation of climate change response; minimizing the extent of climate changes is the most certain way to ensure that communities can respond to them. However, climate-related changes to natural and human systems cannot be avoided entirely. Sonoma County is already experiencing some of these effects, including higher temperatures and more variable rainfall, which results in increased flooding in some years and drought in others. Actions that reduce the community's vulnerability to these and other climate change hazards are collectively referred to as *climate adaptation*. Adaptation is a fundamental part of the County's overall climate action program and necessary to build community resilience. While climate mitigation and adaptation have different objectives, many strategies can be used to simultaneously achieve both goals.

Chapter 6, *Sonoma County Climate Readiness*, provides a vulnerability assessment that screens potential climate hazard impacts on three key community resource areas: people and social systems, built systems, and natural and working lands. This analysis provides a starting point for a countywide discussion on climate impacts and vulnerabilities. Strategies already underway to prepare for climate change are also discussed, along with recommendations to increase local climate change resilience. While the focus of CA2020 is on reducing local contributions to climate change, many strategies to reduce emissions will also help strengthen climate resilience. Measures that advance local resilience to climate impacts are identified in Chapter 3, *Reducing Community Emissions.*

Figure 1.2-1 illustrates the building blocks of climate response. Again, stopping human contributions to climate change is the most important step to minimize the impact of climate change on communities.

**Figure 1.2-1. Building Blocks of Climate Response**


Addressing symptoms
Emergency services
Short-term effectiveness
Safety measures, disaster prevention
Protecting human systems
Protecting natural systems
Protecting clean air and water supply: forests, rivers, groundwater
Addressing causes
Reducing greenhouse gas emissions
Long-term effectiveness

Concept: Sara Moore.

### 1.2.2 Building on Existing Climate Action Efforts

The State of California and Sonoma County communities recognized the challenge of climate change and have already taken action to meet the GHG reduction imperative. The challenge is enormous, but Sonoma County is not starting from scratch. CA2020 builds on earlier efforts to chart a future that will dramatically reduce countywide GHG emissions.

## State Leadership

California is a global leader in addressing climate change and reducing GHG emissions.

- In 2005, Governor Schwarzenegger signed Executive Order S-03-05 establishing a long-term goal of reducing GHG emissions by 80% below 1990 levels by 2050.[1]
- Enacted in 2006, Assembly Bill (AB) 32 requires statewide GHG emissions to be reduced to 1990 levels by 2020. The *AB 32 Scoping Plan* identifies specific measures for achieving this goal, including recommending that local governments establish GHG reduction goals for both their municipal operations and for the community, consistent with those of the state.
- In 2015, Governor Brown signed Executive Order B-30-15 establishing a medium-term goal of reducing GHG emissions by 40% below 1990 levels by 2030. The Governor's order requires the California Air Resources Board (ARB) to update its scoping plan to identify the measures needed to meet the 2030 target; that effort should be completed in late 2016.

In addition, the state has adopted key regulations that will help Sonoma County meet its regional emissions reduction goals.

- Renewables Portfolio Standard (RPS) – requires greater amounts of renewable energy in electricity generation throughout the state
- Pavley/Advanced Clean Car Program– requires higher gas mileage in new cars sold in California
- Low-Carbon Fuel Standard (LCFS) – requires a reduction in the GHG intensity in transportation fuels
- Cap-and-Trade Program – reduces overall emissions from electricity generation and transportation fuel

More information on these state regulations and their influence on Sonoma County emissions can be found in Chapter 3, *Reducing Community Emissions*, and in Appendix C.

## Sonoma County Leadership

In Sonoma County, community leaders and forward-thinking elected officials in each city and in county government have worked together to establish strong action on climate change.

- **1990:** Voters approved a sales tax measure to create the Sonoma County Agricultural Preservation and Open Space District (SCAPOSD) to preserve agricultural and open space lands throughout the county. Voters overwhelmingly reauthorized the sales tax measure in 2006.

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[1] Executive orders are binding only on state departments, not on the private sector or local governments. However, pending legislation (Senate Bill 32) would, if approved by the legislature and signed by the governor, adopt the target for 2030 into state law and give the ARB authority to adopt binding long-term GHG targets.

- **2001:** All Sonoma County communities committed to the International Council for Local Environmental Initiatives campaign called *Cities for Climate Protection*, an international initiative to reduce GHGs through local government action.
- **2005:** The elected leadership in all Sonoma County communities adopted a countywide GHG emissions reduction target of 25% below 1990 levels by 2015. The City of Cotati adopted an even more aggressive goal of 30% below 1990 levels by 2015.
- **2008:** A local community non-profit group, the Climate Protection Campaign (now known as the Center for Climate Protection), developed the *Sonoma County Community Climate Action Plan*, which was the first community-wide examination of strategies to reduce community-wide GHG emissions.
- **2008:** Voters in Sonoma (and Marin) County approved a local sales tax measure to fund development of passenger rail service, Sonoma-Marin Area Rail Transit (SMART).
- **2009:** Sonoma County jurisdictions established the nation's first Regional Climate Protection Authority (RCPA), a multi-jurisdictional agency tasked with coordinating countywide efforts to reduce GHGs and become more resilient to climate change. RCPA member jurisdictions and their partners have created and successfully pioneered innovative approaches to climate solutions including Property Assessed Clean Energy (PACE) financing, Pay As You Save (PAYS) on-bill repayment for resource efficiency, community choice aggregation, carbon-free water, electric vehicle infrastructure deployment, climate action through conservation, adaptation planning, and more.
- **2012:** The City of Santa Rosa was the first local government in the county to adopt its own CAP and a new GHG emissions target of 25% below 1990 levels by 2020.

Community leadership has resulted in direct actions by the citizens, businesses, and communities in Sonoma County to reduce GHG emissions. For example:

- All communities in the county (except Healdsburg, which has its own electric utility) now participate in the local Community Choice Aggregation program, SCP, which provides electricity with a higher renewable energy content than otherwise available. Healdsburg's municipal utility has provided electricity with a large renewable portfolio for many years.
- The County established a PACE program known as the Sonoma County Energy Independence Program to help property owners finance energy and water efficiency improvements. This program has reduced GHG emissions equal to taking 3,000 cars off the road and generated enough clean energy to power nearly 6,000 homes for a year.
- RCPA and jurisdictions county-wide support energy-efficiency efforts and solar retrofits through a variety of programs. Waste minimization, recycling, and composting programs are already an essential part of resource conservation in the county.
- The Sonoma County Water Agency is a leader in innovating low-carbon methods for delivering water supplies and conserving water. Sonoma County Water Agency reached its

goal of a carbon-free water delivery system in 2015, and is also a prominent supporter of energy conservation financing.

- Sonoma County is a center for sustainable wine growing and other sustainable agricultural practices. The Resource Conservation Districts started a “carbon farming” program in 2015 to accelerate the rate at which carbon is sequestered from the atmosphere into soil and wood biomass.

By 2010, Sonoma County communities had reduced countywide GHG emissions to approximately 7% below 1990 levels, even while the county’s population grew by 25% and employment grew by 17% between 1990 and 2010. On a *per capita* basis, county GHG emissions declined approximately 26% over the same period.

CA2020 builds on these existing programs and proposes additional measures that Sonoma County communities can implement to achieve significant GHG emissions reductions in 2020 and beyond, eventually reaching the goal of an 80% emissions reduction by 2050.

For a list of strategies that have already been implemented by each community, please refer to Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*.

### 1.2.3 How Will this Plan Help Sonoma County Residents and Businesses?

#### Reducing GHG Emissions Is No Longer Optional

Given the magnitude of human-induced climate change and the projected catastrophic effects from continued global warming, reducing GHG emissions has become an environmental and societal imperative. In response, GHG reduction mandates from the state and, increasingly, from the federal government will require local government action. In California, state legislation (AB 32) with a mandate to reduce GHG emissions to 1990 levels by 2020 is only the beginning; much sharper GHG reductions are needed to protect our environment, our health, and our economy from the potentially catastrophic effects of increasing global temperatures. CA2020 is intended to help Sonoma County communities respond to the climate change imperative as well as legal mandates.

#### Reducing GHG Emissions Is Good Business

Reducing GHG emissions will make Sonoma County businesses more efficient and will save money for residents and business owners. Weatherizing or adding solar to existing homes, for example, creates construction jobs and cuts residents’ utility bills. When businesses increase energy efficiency or add on-site renewable energy generation, they reduce operating costs and employ electricians, engineers, builders, and plumbers. For example, a locally owned quarry (Mark West Quarry) recently hired a local solar energy company to install a solar array that will pay for itself in only seven years by cutting the company’s energy bills in half. The Sonoma County Green Business Program recognizes and promotes businesses that operate in an environmentally responsible way, including reducing their carbon footprints. Sonoma County businesses are already exporting the products and services they develop to respond to climate change. For example, Petaluma-based Enphase has become a worldwide leader in micro-inverter technology used in solar photovoltaic systems. As the world moves to a low-carbon economy and invests in climate-ready communities, Sonoma County businesses will reap the rewards of their leadership.

As described in more detail in Section 1.5, CA2020 will also facilitate a more streamlined environmental review process for future development projects that incorporate its GHG reduction measures.

### Reducing GHG Emissions Supports Other Community Goals

Implementing CA2020 will result in environmental and community “co-benefits” that go beyond GHG emissions reductions. For example, many of the actions will improve public health by reducing air pollutants like ozone, carbon monoxide, and fine particulates. Measures to improve mobility and alternative modes of transportation will increase walking and biking, activities that substantially lower the incidence of disease. These changes can also complement and encourage other sustainable modes of transportation, including public transit.

The GHG reduction measures in this CAP create community co-benefits in a variety of ways.

- GHG reduction measures for the Building Energy and Transportation sources will reduce electricity and gasoline usage, which can help lessen the impact of future energy cost increases on county businesses and residents.
- Reducing gasoline consumption also reduces dependence on foreign oil and the environmental impacts of oil exploration, production, and transportation.
- Recycling and waste diversion measures will also reduce material consumption and the need for landfill space.
- Water efficiency measures will reduce water use in a water-constrained future and adapts to the long-term hydrological effects of climate change.
- Land use measures in CA2020 will conserve natural resources and protect the long-term viability of natural and working landscapes in the county.
- Open space preservation also offers aesthetic and recreational benefits for community residents as well as habitat for native wildlife and plants.
- Sustainable agriculture and wine-making practices will help preserve agricultural soil fertility and protect water quality.

The measures in this CAP provide an opportunity to lower carbon emissions and achieve a diverse range of community co-benefits. Anticipated community co-benefits associated with CA2020 are listed in Table 1.2-2. Chapter 3*, Reducing Community Emissions*, provides additional information on the relevant co-benefits.

**Table 1.2-2. Community Co-Benefits**

| Co-Benefit | Key | Description |
|---|---|---|
| Energy Savings | | Measures to increase energy efficiency can reduce energy costs and lessen the impact of future energy price increases on county businesses and residents. Reducing petroleum and natural gas use through efficiency and fuel switching also reduce dependence on imported energy and the environmental impacts of fossil energy exploration, production, and transportation. |
| Air Quality Improvements | | Measures to reduce or eliminate the combustion of fossil fuels can reduce local and regional air quality challenges caused by ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter. These air pollutants cause damage to people, ecosystems, and infrastructure. |
| Public Health Improvements | | Measures that improve air quality create benefits for public health by reducing pollutants. Measures that increase use of active transportation and enhance public open spaces can improve health by encouraging walking, biking, and outdoor recreation. These co-benefits directly support the mission of Sonoma County *Health Action*, aimed at achieving equity and health for all in Sonoma County. |
| Job Creation | | Measures to retrofit buildings, build and operate local and distributed renewable energy systems, increase transit use, increase waste diversion, and other strategies that rely on local labor can create opportunities for the workforce and retain dollars to be reinvested in the local economy. |
| Resource Conservation | | Recycling and waste diversion measures reduce material consumption and the need for landfill space. Water efficiency measures reduce water demand and preserve water resources. Land use measures conserve natural resources and protect the long-term viability of natural and working landscapes in the county. Open space preservation also offers aesthetic and recreational benefits for community residents as well as habitat for native wildlife and plants. Sustainable agriculture practices will help preserve agricultural productivity and ecological health. |
| Cost Savings | | Many strategies to reduce emissions reduce waste by increasing efficiency, therefore reducing the costs to receive the same service (be that light, heat, water, or transportation). Many measures offer downstream cost savings in addition to direct utility or fuel cost savings, such as reduced health care costs, reduced need to invest in marginal water or energy supply, lower maintenance costs, etc. |
| Climate Resilience | | Many strategies to reduce emissions also help prepare communities for local climate impacts by advancing the climate resilience goals adopted by the RCPA Board (see Chapter 6). |
| Equity | | Climate action is a broadly important strategy to promote equity because people with existing social vulnerabilities – lower levels of income, health, or education – are disproportionally affected by climate change impacts. Many measures that reduce GHGs can have equity benefits if designed to serve disadvantaged populations by lowering housing, transportation, and energy costs and improving health outcomes. |

# 1.3 How Does This Plan Work?

## 1.3.1 A Regional Approach to Reducing GHG Emissions

Sonoma County communities have a long history of implementing and promoting initiatives to protect the environment and conserve natural resources. This tradition includes creation of the RCPA in 2009, the nation's first regional climate protection authority, in a move that recognized both the magnitude of the challenge and the cross-jurisdictional nature of climate change and GHG emissions. If ever an issue called for a coordinated, multi-partner effort, it is climate change; progress depends on Sonoma County communities working together. The approach in CA2020 calls for coordinated local actions to achieve a regional target—reduce countywide GHG emissions to 25% below 1990 levels by 2020—including leveraging initiatives already underway at the state and regional (Bay Area) level. The collaboration embodied in CA2020 will continue as the communities work to meet the RCPA's long-term GHG reduction goals of a 40% reduction by 2030 and an 80% reduction by 2050.

A regional GHG reduction goal—as opposed to individual goals for each community—recognizes the shared nature of the challenge as well as the fact that Sonoma County communities each have a different capacity to achieve GHG reductions; smaller communities typically have fewer opportunities to achieve substantial GHG reductions.

### Statewide GHG Reduction Efforts Have Local Impact

Statewide programs to reduce GHG emissions are a fundamental part of CA2020 and will deliver over 50% of the GHG emissions reductions needed to achieve the 2020 target. For example, the state's RPS will reduce the carbon content of electricity throughout the state, including Sonoma County, yielding over 180,000 MTCO$_2$e in annual GHG reductions locally. The CAP reflects the impact of nine state measures that address issues related to building energy and transportation.

1. Title 24 Energy Efficiency Standards for Commercial and Residential Buildings (Title 24)
2. Lighting Efficiency and Toxics Reduction Act (AB 1109)
3. Industrial Boiler Efficiency
4. Renewables Portfolio Standard (RPS)
5. Residential Solar Water Heater Program (AB 1470)
6. Low Carbon Fuel Standard (LCFS)
7. Pavley Emissions Standards for Passenger Vehicles
8. Advanced Clean Cars
9. Vehicle Efficiency Measures in AB 32

## Local Government and Regional Agency Action

Although state programs are essential to meeting Sonoma County's GHG reduction goal, they will not be enough to reach that goal by themselves. Action by local governments and regional agencies—the entities that control land use, infrastructure, and community services—is critical. It will take the full combined efforts of local governments and regional initiatives, together with state programs, to reach the County's GHG reduction goal. **Together, CA2020 measures will promote building energy efficiency and renewable energy production, support alternative modes of transportation, enhance open spaces, and help reduce water consumption and wasted materials.**

The GHG reduction measures in this CAP were selected after a comprehensive review of potential measures and after local community outreach meetings and workshops and consultation with a Stakeholder Advisory Group (see Section 1.4). A 2014 report titled *Proven and Promising Climate Measures from U.S. Communities for Possible Application in Sonoma County*, prepared by the Center for Climate Protection, was also used to develop GHG reduction measures in this plan. In addition, measures recommended by the California Attorney General and the California Air Pollution Control Officers Association were considered, as were measures from adopted CAPs throughout California. Each local community's general plan and local policies and programs, and comments collected at meetings in each community were also reviewed to develop the measures. Many of the measures in CA2020 build on local community initiatives that are already underway, including local measures required under state law, like implementation of the CalGreen building codes and adoption of local water-efficient landscape ordinances. Other measures provide new opportunities for addressing climate change. Existing policies and measures are summarized in Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*.

This CAP identifies 14 GHG reduction measures for local agency implementation (see Section 1.3.2). Each city and the County reviewed the local measures and selected those to include in their community's commitments. Thus, the specific combination of measures implemented in each community will vary. Although no community will implement all 14 local measures and sub-components, the individual commitments from each community combine into a comprehensive GHG emissions reduction program that will help the county achieve its countywide goal.

Some of the local measures include voluntary, incentive-based programs that will reduce emissions from both existing and new development in the communities. Other measures establish mandates for new development, either pursuant to state regulations or through existing programs. Local governments will also use CA2020 as a tool to communicate and solidify their priorities within their communities.

CA2020 also includes GHG reduction measures that will be implemented by regional entities that can provide some services and resources on behalf of *all* communities more efficiently than the individual communities can on their own, especially the smaller cities. These regional measures are a critical part of CA2020. For example, the Community Choice Aggregation measure encourages residents and businesses to participate in SCP, which provides electricity with lower carbon content than the state's RPS. Other regional entities included in CA2020 are RCPA, Sonoma County Transportation Authority, Sonoma County Agricultural Preservation and Open Space District, and the Sonoma County Energy Independence Program. There are 16 regional measures to reduce GHG emissions, as discussed further in Chapter 3, *Reducing Community Emissions*.

Successful implementation of these actions will require commitment from regional agencies, all communities and their various departments, community groups, the development community, and residents and businesses. For this plan to be successful, RCPA, regional entities, and communities will adaptively manage implementation of CA2020 to ensure that the countywide GHG reduction target is met and that measures are implemented as efficiently as possible. Accordingly, RCPA and communities may revise measures or add new measures to ensure that the region achieves its 2020 reduction target. If adopted and implemented prior to 2020, new federal programs that achieve local GHG emissions reductions beyond state and local mandates may also be added to CA2020.

## Source-based Emissions Reductions

GHG emissions inventories and reduction measures are grouped together under "sources" that enable an organized, countywide look at the human activities that contribute the most GHG emissions and help focus actions where they can have the greatest emissions reduction. CA2020 looks at the following five GHG sources.

- **Building Energy** includes emissions from electricity generation and combustion of natural gas and other fuels (e.g., propane, wood).
- **Transportation, Land Use, and Off-road Equipment** includes emissions from on-road vehicle fossil fuel combustion as well as emissions from equipment (e.g., construction equipment) and off-road vehicles.
- **Solid Waste** includes $CH_4$ emissions from decomposing organic matter in landfills.
- **Water and Wastewater** includes energy-related emissions from water supply pumping and $CH_4$ and $N_2O$ emissions from the wastewater treatment process.
- **Livestock and Fertilizer** includes $N_2O$ emissions from fossil-fuel based fertilizer and $CH_4$ and $N_2O$ emissions from livestock and manure management. Other agriculture-related emissions are accounted for in the other GHG sources. For example, emissions from traffic related to wineries or grape growing are included in the Transportation source.

This source-based approach is the foundation for the analyses in Chapter 2, *Greenhouse Gas Emissions in Sonoma County*, and Chapter 3, *Reducing Community Emissions*. These sources are also the organizing principle in Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*.

### 1.3.2 Putting this Climate Action Plan to Work

#### Plan Adoption by RCPA, Cities, and County

CA2020 reflects an innovative, collaborative approach to responding to climate change. Individual cities and counties throughout the state have adopted CAPs specific to their communities, but CA2020 takes a truly regional (countywide) approach that coordinates the climate protection activities of all the cities and the County to achieve a shared GHG reduction goal. This approach recognizes that, by working together, Sonoma County's communities can achieve greater HG reductions, and do it more efficiently than if each city and the County acted on their own.

The collaborative, regional approach also improves consistency among the participating local agencies. This similarity will help home and business owners who are planning projects or renovations in the cities and the county.

As the lead agency, RCPA will adopt the CAP first (including certification of the Environmental Impact Report prepared for CA2020). Following adoption by RCPA, each city and the County will adopt its portion of CA2020 (see Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*) in a form appropriate to that community. Local adoption could take the form of a General Plan amendment, ordinance adoption, resolution, or some combination thereof.

Once adopted, the cities, County, and regional agencies will implement the measures each has committed to in their respective CAP adoption processes.

#### Implementation Framework

Sonoma County communities have set an ambitious target for GHG emissions reduction, one that will require decisive and rapid action by the local partners. RCPA will coordinate and facilitate implementation actions by the cities and the County, and by regional agencies (e.g., transit, energy, waste). RCPA's role will include aggregating funding opportunities to leverage federal, state, and regional grants; providing technical assistance to local partners; developing shared tools and inter-community efficiencies; and accepting overall accountability for CA2020 implementation.

Each city and the County will develop its own implementation team for the actions that will occur at the local government level. This will include designating a CA2020 Coordinator for each community and an internal implementation structure scaled and organized appropriately to each local agency. Among other things, the local CA2020 Coordinator will serve as the liaison between the city/County and RCPA.

Given the immediacy of the 2020 GHG reduction target, timing is an important factor for plan implementation. The CA2020 implementation plan organizes GHG reduction measures into three groups, based on the lead time needed for each measure in order to achieve results by 2020.

Please refer to Chapter 4, *Implementation*, and Appendix C for additional information regarding implementation and the lead entities for each measure.

## Monitoring and Adaptive Management

How will Sonoma County local governments, residents, and business know if their GHG reduction efforts are effective? How can the County adapt to changing technologies, regulations, state (or federal) policies, and community behavior changes? Not only will RCPA and local partners need to track implementation of the local and regional reduction measures called for in CA2020, but the comprehensive nature of CA2020 will require regular reassessment of community GHG emissions and the overall direction of CA2020. To accomplish this, CA2020 calls for two interim GHG emissions inventories before 2020: one based on 2015 emissions data and the other based on 2018 data. The RCPA Board will also conduct a mid-course review of overall CA2020 effectiveness to allow time for changes that may be needed to stay on target. Where program tracking and inventory updates indicate that CA2020's emissions-reduction strategies are not as effective as originally projected, RCPA will work with local partners to adaptively manage CAP implementation and stay on target, including updating or amending CA2020, if warranted.

Equally important, the RCPA and its members will report to the community on the results of the interim inventories and the mid-course review. Periodic public meetings and presentations to stakeholder groups will occur and other outreach activities, including a public website and email flyers, will be implemented to educate, engage, and empower the community.

Finally, CA2020 is part of a much longer-term effort that will be needed to reduce GHG emissions in Sonoma County. As noted earlier, CA2020 focuses on relatively short-term actions to reduce emissions by 2020 to a degree that is well beyond current state mandates (AB 32). However, even with the ambitious GHG reduction goal in CA2020, further actions will be needed to meet longer-term goals. Therefore, in adopting this CAP, RCPA will also adopt long-term goals to reduce GHG emissions by 40% (compared to 1990) by 2030 and by 80% by 2050. Although the measures in CA2020 will continue to achieve emissions reductions after 2020 and establish a trajectory for reaching longer-term goals, another phase of climate action planning will be needed to meet the goals for 2030 and 2050. This next phase will build on the measures in CA2020, informed by monitoring and adaptive management, and take advantage of new technologies and climate protection science that will be available in the future.

## The Role of New Development in GHG Reduction

Sonoma County's population and economy will continue to grow between now and 2020, and beyond. Some of that growth will result in new development, either on land that is now vacant or as redevelopment with new or more intensive land uses. This new development will be a source of additional GHG emissions in 2020, although emissions related to existing development and activities will remain by far the largest source of GHG emissions. By 2020, new development will account for about 5% of total countywide GHG emissions; existing development and activities will account for 95% of countywide emissions. Emissions from new development are calculated as the growth in emissions from 2016 to 2020, based on socioeconomic forecasts and other emission projection methods (see Chapter 2). In other words, 2020 emissions are estimated to be 5% higher than 2016 emissions.

To ensure that regional GHG emissions are reduced to 25% below 1990 levels, CA2020 accounts for additional emissions from new development in the target inventory for 2020. Meeting the community-wide 2020 GHG reduction target requires new development to be consistent with climate goals by implementing measures that will minimize new GHG emissions. To accomplish this, a "New Development Checklist" (see Appendix A) can be used in the entitlement and permitting process at each jurisdiction that adopts the plan. New development projects that incorporate applicable checklist measures will not only have lower GHG emissions than similar projects had in the past, but they will also contribute to reaching the GHG reduction target set forth in CA2020 by ensuring that emissions from new development do not exceed the GHG "budget" allocated to new development in the 2020 target. Development projects consistent with this CAP may also take advantage of the permit streamlining available under the California Environmental Quality Act (CEQA) (see Section 1.5).

### 1.3.3 How Can Sonoma County Residents Help?

#### Learn about their Household Carbon Footprint

The everyday activities of Sonoma County residents, including driving a vehicle, using electricity and natural gas to light and heat their homes, and throwing away household garbage, result in GHG emissions. Many of these emissions are accounted for in the GHG inventory prepared for this CAP, while others occur elsewhere due to the consumption of goods and services in Sonoma County. Residents can learn about their household carbon footprint and how they can reduce GHG emissions through their own actions—such as driving an electric vehicle, installing solar, or buying electricity from SCP. Cool California (http://www.coolcalifornia.org/) offers a user-friendly tool that allows residents to calculate household emissions by answering questions relating to travel, housing, food, and shopping habits. After completing the questionnaire, residents receive a personal action plan with tips and actions to help reduce their household carbon footprint and save money.

#### Participate in Programs to Reduce Local Emissions

The good news is that while human activities are a major climate change driver, we can also be part of the solution. Once county residents take inventory of their household carbon footprints and better understand their contribution to climate change, they can start taking actions to reduce household GHG emissions and improve their economic picture, thereby helping to meet the countywide GHG reduction target. Sonoma County residents can make impactful choices and changes in their daily lives such as changing light bulbs to compact fluorescents or light-emitting diodes, buying energy-efficient (ENERGY STAR) appliances, heating and cooling smartly, sealing and insulating their homes, reusing and/or recycling materials that might otherwise be thrown away, using water more efficiently, composting food scraps, and purchasing clean power (for more information see http://www3.epa.gov/climatechange/wycd/home.html).

Some of these individual or household actions will be facilitated through the regional or local programs and strategies presented in CA2020. Other actions are based more on individual commitment and choice. For example, individuals can learn about and make purchases that consider the carbon footprint and durability of household goods. This might include buying items made from local, renewable materials or that minimize packaging and shipping. Residents can also make low-carbon lifestyle choices, such as walking or biking, using public transportation, or eating less meat and more local vegetables.

Here are a few of the resources available to Sonoma County residents to help make these changes.

- The Energy Independence Program is a County of Sonoma Energy and Sustainability Division program that serves county residents and businesses as a central clearinghouse of information about energy efficiency, water conservation, and solar energy improvements. It offers tools to property owners and tenants to find the information, resources, rebates, contractors, and financing that fits their situation. See more at: http://sonomacountyenergy.org/homepage/#sthash.3HWfDTmZ.dpuf.
- Energy Upgrade California: Home Upgrade takes a “whole house” approach to addressing home energy waste through building science, pre- and post-project testing, and energy performance analysis to provide maximum energy efficiency results. More information can be found at (707) 565-6470 or http://bayareaenergyupgrade.org.
- Windsor Efficiency PAYS: Windsor residents and businesses can take advantage of the Windsor Efficiency PAYS program, which provides water- and energy-saving upgrades for Windsor residential properties that provide immediate utility bill savings, new water/energy saving appliances, and drought-resistant landscaping—with no upfront cost or debt. See more at: http://sonomacountyenergy.org/residential-programs/#sthash.2VBjpMOi.dpuf.
- SCP is Sonoma County’s official electricity provider, reducing costs and environmental impacts of energy use for customers throughout Sonoma County. By participating in CleanStart, SCP’s default service, participants receive 36% renewable power. If residents or businesses participate in EverGreen, they will receive 100% local renewable power for a premium price.

CA2020 also includes several *Advanced Climate Initiatives* that, among other things, will focus on working with Sonoma County residents to reduce consumption-based emissions. See Chapter 3 for more information on these Advanced Climate Initiatives.

## 1.4 Public Outreach and Community Engagement

CA2020 was prepared with input from community members, elected officials, and staff from the partner agencies. Ten open house-style public workshops were held, including one in each city. These meetings solicited public input on the types of reduction measures that should be included in CA2020. The role of local governments in addressing climate change and reducing GHG emissions was also discussed.

RCPA also provided an online survey that was distributed by email and social media. Additional focus groups and meetings were held with local businesses, agriculture, and service groups. Presentations and updates were given to city and town councils and the Board of Supervisors throughout the project development process, and regular updates were provided to the RCPA Board. The RCPA board held two public study sessions prior to development of CA2020.

The community dialogue that has begun with preparation of this plan will continue throughout implementation of the GHG emissions-reduction measures.

All comments received from the community and the Stakeholder Advisory Group (see below) are documented in Appendix F. Many of the comments support GHG reduction measures that are now included in CA2020. For example, enhanced transit service, expanded bike and pedestrian networks, and promotion of electric vehicles were strongly supported as part of the CA2020 strategy to reduce transportation emissions. Likewise, many comments supported building energy retrofits, distributed renewable energy generation, and sustainable agricultural practices.

The full range of GHG-reduction approaches suggested in public comments is, not surprisingly, extremely varied and generally very forward looking. For example, commenters suggested requiring point-of-sale energy audits, zero-net new water use in new developments, local government divestiture from fossil fuel investments, and greater focus on schools and youth. The measures included in CA2020 represent a subset of the ideas heard from the community. As noted throughout this plan, CA2020 is one step on a long-term path to dramatically reduced GHG emissions. Some of the suggestions gathered as part of the community outreach effort that are not included in CA2020 may very well find a place in future climate action planning in Sonoma County.

Lastly, it is important to acknowledge that a small but vocal segment of the community disagrees with the scientific consensus about the threat posed by global climate change and opposes governmental action to reduce emissions.

### 1.4.1 Stakeholder Advisory Group

To help guide the process, the RCPA Board of Directors selected a Stakeholder Advisory Group to represent a diversity of viewpoints and technical expertise from each community. The main role of the Advisory Group was to work with local agency staff to develop a CAP that will have broad community support for the GHG emissions-reduction programs and measures needed to meet Sonoma County’s ambitious target. Three representatives from each city and two representatives from each county supervisorial district were selected; some representatives had input from city councils, though none were elected officials themselves.

The Stakeholder Advisory Group sought representation from a broad spectrum of interests, including renewable energy, agriculture, viticulture, business, community non-profits, the environment, transportation, social justice, environmental justice, real estate, health, economic development, education, open space, waste, water, and building efficiency.

The Stakeholder Advisory Group met five times at key milestones during the project. All meetings were open to the public and each meeting included an opportunity for the public to provide comments. Several ad hoc working groups from the Stakeholder Advisory Group were also convened during the development of the draft CAP to review detailed assumptions for certain GHG sources.

## 1.5 Relationship between the CAP and CEQA

The cities of Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, and Windsor and the County of Sonoma will use CA2020 to comply with project-level GHG impact analysis requirements under CEQA. Santa Rosa will continue to use its adopted CAP for this purpose.

The State CEQA Guidelines (Section 15183.5) allow the GHG impacts of future projects to be evaluated using an adopted plan for reduction of GHG emissions, like CA2020, provided that the plan meets specific requirements. The six requirements specified in the State CEQA Guidelines are listed below with CA2020's compliance described in *italics*.

1. Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area. *CA2020 quantifies GHG emissions from all primary sources within county jurisdictions for 1990, 2010, 2015, 2020, 2040, 2030, and 2050*.
2. Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable. *CA2020 establishes a countywide GHG emissions target of 25% below 1990 levels by 2020, a target that goes well beyond the requirements of AB 32 and puts Sonoma County on a trajectory to achieve the even greater GHG reductions needed in the future. CA2020 includes a GHG emissions budget for new development that will ensure that the countywide reduction target is met, even with projected population and economic growth. The GHG reduction measures in CA2020 will reduce project-specific emissions and thereby ensure that the new-development share of total future emissions is not exceeded. Reducing and limiting emissions from new development is part of an overall strategy that substantially reduces emissions countywide and, therefore, contributions from new development that is consistent with CA2020 would not be cumulatively considerable.*
3. Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area. *CA2020 analyzes community emissions, by source, for the partner communities, including emissions from projected growth and development expected by 2020 and beyond.*
4. Specify measures or a group of measures, including performance standards that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level. *CA2020 includes specific measures to achieve the overall reduction target (see Chapter 3 and Appendix C)*.

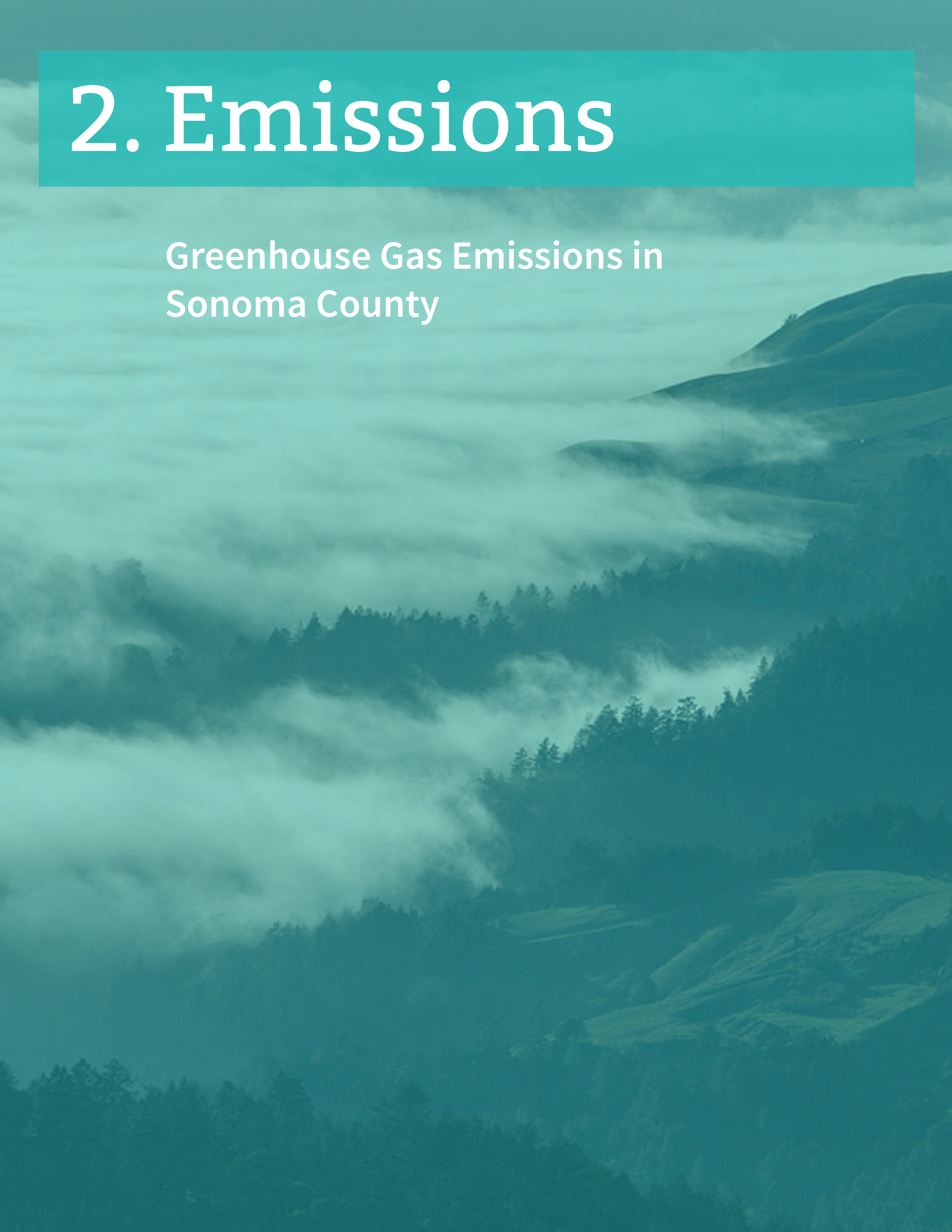
5. Establish a mechanism to monitor the plan's progress toward achieving the GHG emissions level and to require amendment if the plan is not achieving the specified level. *CA2020 includes periodic monitoring of plan progress and will be amended as needed to reach the reduction target (see Chapter 4)*.
6. Adopt the GHG emissions reduction plan in a public process following environmental review. *As described in Section 1.3.2 above, a Programmatic Environmental Impact Report will be prepared for CA2020 and the CAP itself will be adopted first by RCPA, followed by adoption of community-specific portions by each local partner. The adoption process will include public outreach and public hearings.*

Once CA2020 is adopted, it may be used in the cumulative impacts analysis of later projects, a process known in CEQA as "tiering." Tiering from the CAP potentially eliminates the need to prepare a quantitative assessment of GHG emissions on a project-by-project basis, which can help streamline the environmental review and permitting processes for these projects. To accomplish this, future project-specific environmental documents must include all applicable mandatory CA2020 measures and ensure that they are binding and enforceable by incorporating measures into the project design or identifying them as mitigation measures and conditions of approval. Future projects that incorporate mandatory CA2020 actions will not have a cumulatively considerable impact related to GHG emissions and climate change (unless substantial evidence warrants a more detailed review of project-level GHG emissions).

Appendix A provides a Climate Action Plan consistency checklist template to be adapted and modified for use by local agency planning staff to assist in determining a project's consistency with CA2020 for the purposes of CEQA tiering. Where the checklist demonstrates that a discretionary project includes all applicable mandatory local or regional measures in CA2020, local agencies can conclude that the project's impact related to GHG emissions would be less than significant under CEQA because the project is consistent with a qualified GHG reduction plan under State CEQA Guidelines Section 15183.5.

# 2. Emissions

## Greenhouse Gas Emissions in Sonoma County



## Chapter 2

# Greenhouse Gas Emissions in Sonoma County

## 2.1 Introduction

Estimates of historic, current, and future greenhouse gas (GHG) emissions are essential to understanding local emissions sources that communities can influence to reduce local contributions to climate change. These estimates, referred to as *inventories*, help to define priorities for emissions reduction strategies and for tracking progress.

The activity-based inventory approach used in this CAP focuses on sources of emissions that a local jurisdiction can readily influence. At this time, it keeps separate two important ways in which actions taken in Sonoma County influence GHG emissions: goods consumption (i.e., emissions that result from local consumption of goods produced in other places) and biological carbon sequestration and emissions from the land base. Although not part of the activity-based inventory at this time, these important aspects of understanding local opportunities to reduce GHG emissions while engaging residents and the agriculture community are explored further in Section 2.4, below, and will be incorporated in the County's GHG goals in the future, as outlined in Chapter 3, *Reducing Community Emissions*.

Several GHG inventories were developed for this plan. The 1990 *backcast* estimates historic emissions levels and serves as the baseline for measuring future GHG reductions; the 2010 inventory measures existing emissions sources and forecasts future emissions in 2020, 2040, and 2050 under a business-as-usual (BAU) scenario (i.e., without implementation of climate action strategies). More details on data sources and specific methods used for each GHG source can be found in Appendix B.

Roughly 3.9 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) emissions were generated by activities in Sonoma County in 1990 (see Table 2-1). By 2010, emissions were 9% lower, at about 3.6 $MMTCO_2e$. However, in the absence of state and local climate action, emissions are projected to grow to 4.3 $MMTCO_2e$ by 2020, largely driven by population and economic growth.

**Table 2-1. Summary of Countywide Emissions**

| | Backcast | Inventory | Business-as-Usual Forecasts | | |
|---|---|---|---|---|---|
| **Key Climate Action Plan Indicators** | **1990** | **2010** | **2020** | **2040** | **2050** |
| Countywide emissions ($MTCO_2e$) | 3,944,000 | 3,601,000 | 4,343,000 | 4,923,000 | 5,113,000 |
| Percent change from 1990 | N/A | -9% | 10% | 25% | 30% |
| Per capita emissions ($MTCO_2e$/person) | 10.2 | 7.8 | 8.6 | 8.6 | 8.5 |
| CA per capita emissions ($MTCO_2e$/person)[1] | 14.5 | 12.1 | 12.5 | 12.9 | 13.8 |
| Population (people) | 388,222 | 459,973 | 507,727 | 573,489 | 601,140 |
| Housing (housing units) | 149,382 | 180,465 | 202,035 | 228,688 | 239,497 |
| Employment (jobs) | 172,064 | 195,121 | 230,151 | 247,051 | 254,428 |

[1] For details on how the California per capita emissions were estimated, please refer to Appendix C.

## 2.2 Measuring Emissions

### 2.2.1 What Is in the Inventories?

The inventories of community-wide GHG emissions in Sonoma County capture the primary sources of emissions that can be reduced through the actions of local governments and regional entities: energy use in our homes, businesses, vehicles, and off-road equipment; emissions from treating and delivering water; emissions from materials that are thrown away; and fertilizer and livestock operations. This approach is known as an “activity-based” inventory. It involves measuring or modeling the primary emissions-generating activities in Sonoma County and translating them into GHG emissions based on standard or locally specific emissions factors. Most sources included cause emissions within the county. However, some emissions that occur outside the county are also included but only to the extent that such emissions are the direct result of community activities that can be reduced through local actions. For example, GHG emissions from regional power plants that provide electricity to local homes and businesses are included, even though the power plants may not be located within the county.

### Example: Estimating Building Energy Emissions

Here is a quick overview of how building energy GHG emissions are estimated:

**Step 1:** Determine which utilities supply electricity and natural gas to residents and businesses in the unincorporated areas.

**Step 2:** Obtain annual energy usage from the utilities. Electricity consumption is provided in terms of kilowatt hours, whereas natural gas usage is provided in terms of therms.

**Step 3:** Multiply electricity and natural gas quantities by GHG emission factors.

**Step 4:** Add emissions from electricity and natural gas to determine total GHG emissions from building energy use.

Local emissions-generating activities addressed in this plan are summarized in Table 2-2. The analysis of emissions includes carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$). Of these gases, $CO_2$ emissions contribute the most to global warming, both internationally and locally. For certain GHG sources (e.g., dairies and livestock, solid waste, wastewater treatment), $CH_4$ and $N_2O$ play a more significant role. All three gases are expressed as metric tons of carbon dioxide equivalent ($MTCO_2e$), based on the global warming potential of these gasses relative to $CO_2$ (see Chapter 1).

### Global Warming Potentials for Greenhouse Gases

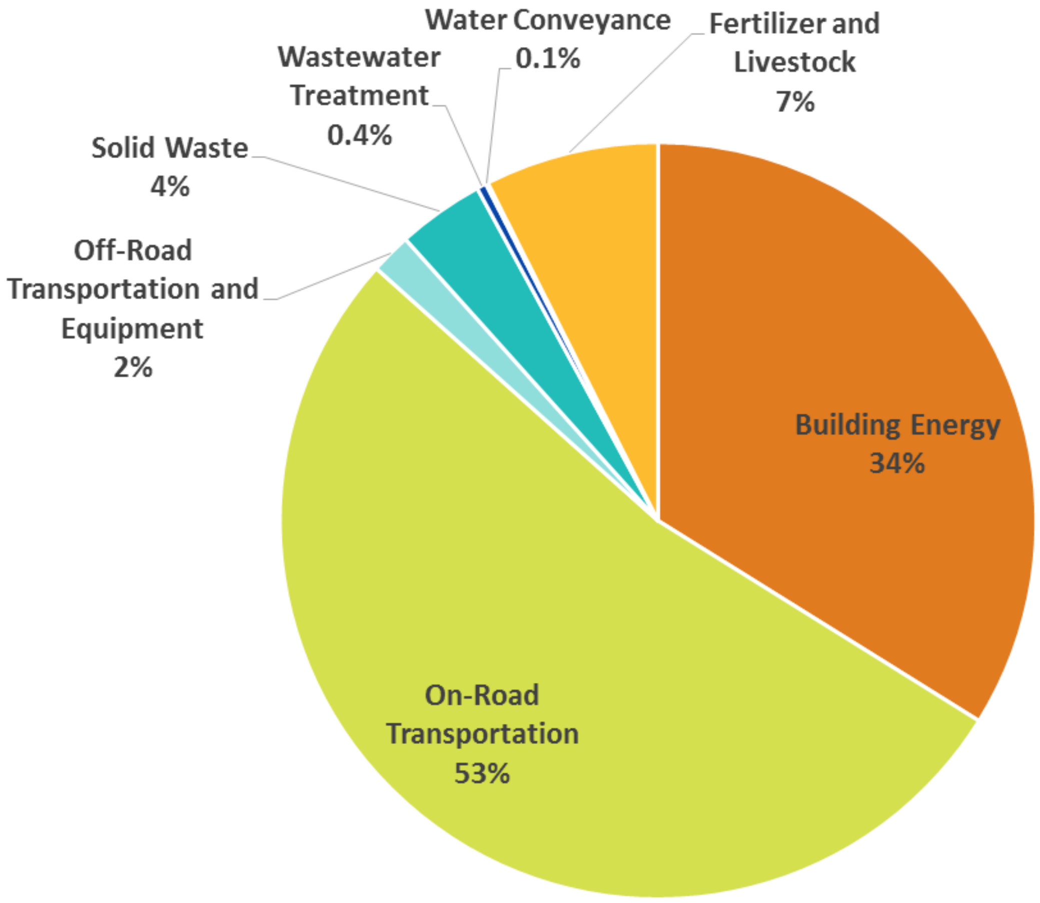
GHGs are not created equally. The Global Warming Potential, or GWP, is used to compare GHGs based on their potential to trap heat and remain in the atmosphere. Some gases can absorb more heat than others and thus have a greater impact on global warming. For example, $CO_2$ is considered to have a GWP of 1, whereas $N_2O$ has a GWP of 265. This means that $N_2O$ is 265 times more powerful than $CO_2$.

### Table 2-2. Key Activity Data by GHG Source

| Source | Primary Emissions Sources | Key Activity Data | Data Sources |
|---|---|---|---|
| **Building Energy** | • Production of electricity (emissions generated at power plants)<br>• Combustion of natural gas<br>• Combustion of other fuels (e.g., propane, fuel oil, wood) in residences | • Total electricity use (megawatt hours)<br>• Total natural gas use (therms)<br>• Total fuel combustion for other fuels | • Electric utilities: Pacific Gas & Electric (PG&E), City of Healdsburg, Sonoma Clean Power (in years after 2010)<br>• Natural gas utilities: PG&E<br>• Other fuels |
| **On-Road Transportation** | • Combustion of gasoline and diesel fuel in vehicles<br>• Combustion of fuels in transit vehicles | • Vehicle miles traveled<br>• Fuel type and fuel economy of countywide vehicle fleet<br>• Travel patterns | • Sonoma County Transportation Authority<br>• California Air Resources Board's (ARB) EMFAC2011 model |
| **Off-Road Transportation and Equipment** | • Combustion of fossil fuels in equipment (e.g., cranes, bulldozers, lawn mowers)<br>• Combustion of fossil fuels in off-road vehicles (e.g., ATVs, boats) | • Fuel consumption in off-road vehicles and equipment<br>• Socioeconomic data | • ARB's OFFROAD 2007 and OFFROAD2011 model |
| **Solid Waste** | • Methane emissions from decomposition of organic matter sent to landfills | • Tons of waste (residential and commercial) sent to landfills<br>• Profile of waste material for residential and commercial waste in each jurisdiction (e.g., 19% paper, 36% food waste) | • Sonoma County Waste Management Agency |
| **Wastewater Treatment** | • Emissions of methane and nitrous oxide that occur during wastewater treatment | • Population served by each wastewater treatment plant (WWTP)<br>• Method of wastewater treatment at each WWTP<br>• Amount of digester gas produced at each WWTP | • Sonoma County Water Agency<br>• Sanitation districts and jurisdictions that operate a WWTP |
| **Water Conveyance** | • Production of electricity associated with the pumping and movement of water from source to user (emissions generated at power plants) | • Water consumption<br>• Water supply sources (e.g., groundwater, Russian River) | • Urban Water Management Plans for each jurisdiction<br>• Sonoma County Water Agency |
| **Livestock and Fertilizer** | • Emissions of nitrous oxide from the application of fertilizer<br>• Emissions of methane and nitrous oxide from livestock and manure management | • Acres and types of crops grown in the county<br>• Livestock population numbers | • Sonoma County Agricultural Commissioner |

The 2010 countywide inventory reveals that two activities are responsible for 87% of locally generated emissions: transportation and building energy use (see Figure 2-1). Livestock, fertilizer, solid waste, water, wastewater, and off-road equipment represent smaller sources in Sonoma County; however, these activities still hold opportunity for emissions reductions.

**Figure 2-1. 2010 Countywide GHG Emissions by GHG Source**



### 2.2.2 Which Years Were Measured?

Several GHG profiles were developed for Climate Action 2020 (CA2020):

**1990 Backcast:** An estimate of community-wide emissions levels in 1990 was developed to understand historic emissions levels in Sonoma County and provide a baseline for measuring future GHG reductions. This baseline year aligns with the statewide baseline in Assembly Bill 32, California's climate action framework through 2020. Emissions data for 1990 are not available for all GHG sources to the degree they are available now; therefore, 1990 levels were estimated with available socioeconomic and source-specific data and emissions factors when possible, using the same protocol for the 2010 inventory and future forecasts.

**2010 Inventory:** The 2010 community inventory was developed by using actual activity data, such as kilowatt-hours and vehicle miles traveled, as reported by utilities and other local agencies. Emissions generated by community activities were analyzed using widely accepted methodologies and procedures recommended by federal, state, and local air quality management agencies. The primary protocol used was the *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* (ICLEI – Local Governments for Sustainability 2012). In that protocol, 2010 was chosen with the input of the jurisdictions and other relevant stakeholders, taking into account data availability and completeness. A key consideration was the existence of highly reliable socioeconomic information from the 2010 U.S. Census.

**Business-as-Usual (BAU) Forecast**: GHG emissions forecasts for 2015, 2020, 2040, and 2050 were based on projected growth in population, employment, and households in the county (see Table 2-1). Forecasts for 2015 and 2020 were developed to evaluate the magnitude of the challenge in meeting the short-term target of 25% below 1990 levels. Forecasts even further into the future (2040 and 2050) were developed to help prepare the county to meet long-term GHG reduction goals. Data used for the BAU forecasts are predictions of community emissions that would occur in future years without accounting for federal, state, and local actions to reduce GHG emissions. Although Sonoma County's GHG reduction target is based on a 1990 baseline, the BAU forecasts also help show the magnitude of the challenge to reach the target.

Analysis was done for each source within the inventory and for each jurisdiction in Sonoma County. Detailed methodologies for calculating emissions for each source, jurisdiction, and year are provided in Appendix B.

# 2.3 Inventory Results

## 2.3.1 GHG Emissions in Sonoma County by Source

This section begins with an overview of GHG emissions from all sources, calculated as outlined in Appendix B, followed by a more detailed description of existing emissions for each source (see Table 2-3 and Figure 2-2). These source-specific discussions provide a deeper exploration of the main factors that influence GHG emissions. This analysis was then used to identify the most effective emissions reduction opportunities, which are reflected in the reduction measures in Chapter 4.

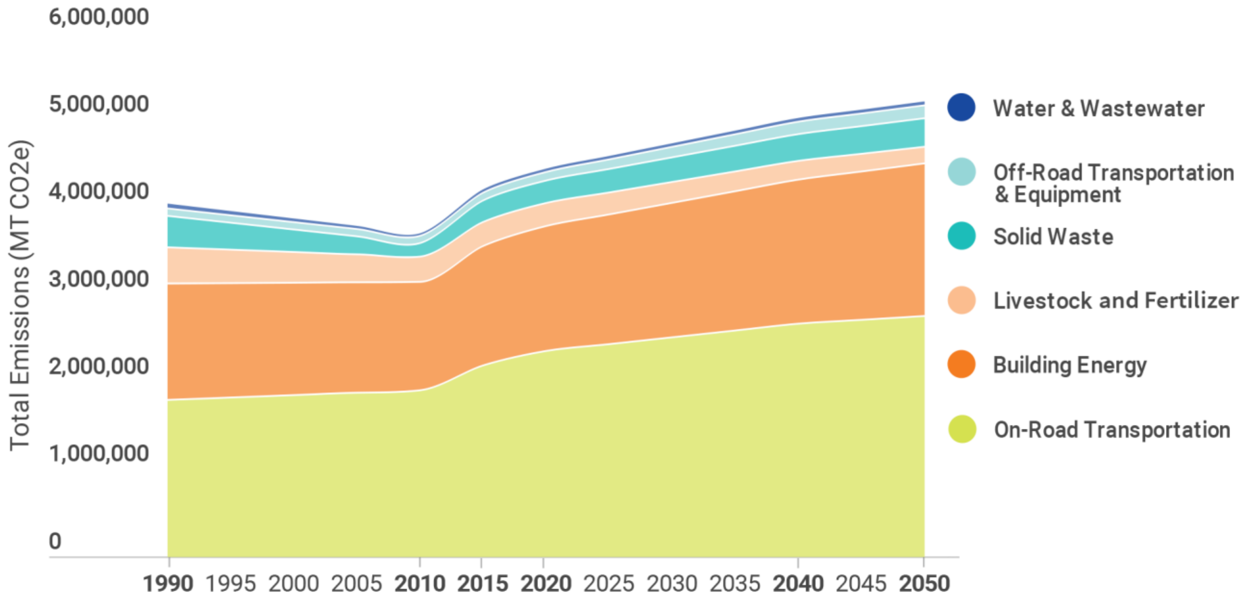
**Table 2-3. GHG Inventory and Forecast Results by Source, and Year**

| Emission Source | Emissions ($MTCO_2e$) | | | | | |
|---|---|---|---|---|---|---|
| | Backcast | Inventory | BAU Forecasts | | | |
| | 1990 | 2010 | 2015 | 2020 | 2040 | 2050 |
| Building Energy | 859,000 | 1,220,000 | 1,347,390 | 1,410,500 | 1,629,900 | 1,728,100 |
| On-Road Transportation | 1,203,000 | 1,899,000 | 2,183,420 | 2,349,500 | 2,661,500 | 2,749,400 |
| Off-Road Equipment | 43,000 | 62,000 | 68,470 | 77,300 | 121,600 | 126,600 |
| Solid Waste | 281,000 | 134,000 | 224,880 | 235,900 | 285,100 | 305,700 |
| Wastewater Treatment | 15,000 | 15,000 | 13,400 | 13,600 | 14,800 | 15,500 |
| Water Conveyance | 27,000 | 4,000 | 13,030 | 13,600 | 17,000 | 18,400 |
| Fertilizer and Livestock | 393,000 | 268,000 | 254,420 | 242,600 | 193,500 | 169,000 |
| Santa Rosa 1990 Emissions[1] | 1,123,100 | — | — | — | — | — |
| **Sonoma County Total** | 3,944,000 | 3,601,000 | 4,105,000 | 4,343,000 | 4,923,000 | 5,113,000 |

Notes:

[1] Santa Rosa's emissions in 1990 are not available from the city's Climate Action Plan (CAP); 1990 emissions were thus assumed to be equal to 15% below the baseline level of emissions, per the city's CAP. As a result, source emissions for Santa Rosa in 1990 are not available and are included as a separate line item. Santa Rosa emissions for all other years are disaggregated into each source.

**Figure 2-2. Countywide GHG Inventory and Forecast Results by Source and Year**[1]



Transportation and building energy generate the vast majority of local GHG emissions and, without effective reduction measures, emissions from these sources will steadily increase as the county's population and employment increase. Fortunately, these two sources also present the greatest opportunities for GHG emission reductions. Emissions from solid waste and water conveyance decreased dramatically between 1990 and 2010 because of increased waste diversion efforts and more efficient water delivery methods. Emissions from wastewater treatment were approximately the same in 1990 and 2010 despite an increase in population, most likely due to a shift to less emissions-intensive wastewater treatment methods and a decline in per capita wastewater flows. Fertilizer and livestock emissions declined between 1990 and 2010 and will continue to do so in future years because of declining livestock-related agriculture and improved livestock manure management in the county.

Countywide GHG emissions decreased by 8.7% between 1990 and 2010 but will increase by 21% between 2010 and 2020 under BAU conditions, absent any GHG reduction effort. Most of the projected increase in BAU emissions between 2010 and 2020 is due to increases in emissions from building energy use and on-road transportation resulting from growth in population and housing. These GHG sources will also increase as a result of new development by 2020.

By 2050, BAU emissions are forecast to grow by 42% from 2010 levels to more than 5 million metric tons. Again, most of that growth will be driven by building energy use and transportation.

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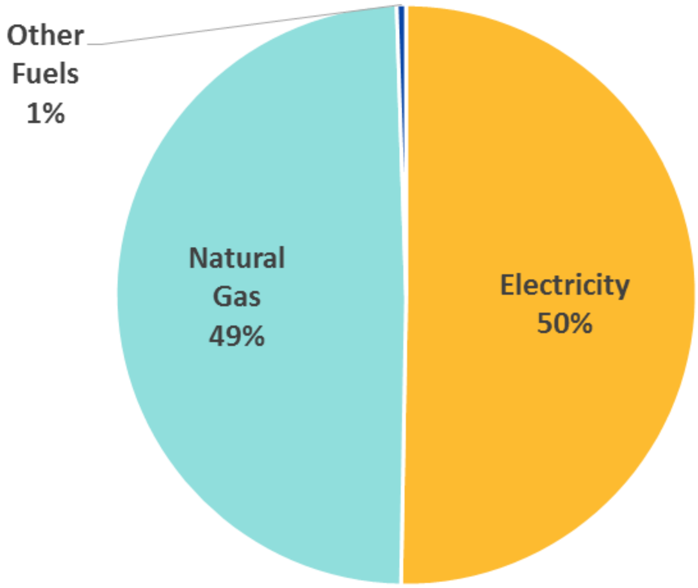
[1] The 1990 emissions in this chart include Santa Rosa's total 1990 emissions apportioned to each source using the 2010 inventory source distribution for the city (actual 1990 emissions by source are not available).

## Existing Emissions from Building Energy

Electricity production and the direct combustion of natural gas in buildings generated more than **1.2 million $MTCO_2e$ in 2010**, making building energy use the second-largest source of community emissions (about 34%), behind on-road transportation. Increases in population and employment, along with rising temperatures and cooling demands, will increase building energy use and associated GHG emissions in the future without further action.

**Building Energy Emissions by Fuel.** Roughly 50% of total building energy emissions come from electricity generation, and 49% comes from the combustion of natural gas (see Figure 2-3). A relatively small amount of other fuels—wood, propane, and kerosene—are used in buildings in Sonoma County, representing 1% of building energy emissions.[2] Building energy measures in CA2020 are focused on the two major fuels used in buildings, although measures that improve building energy efficiency will also reduce emissions related to other fuels.

**Figure 2-3. Building Emissions by Fuel**



As shown in Figure 2-4, the electricity consumed in Sonoma County in 2010 was already relatively low in GHG intensity, compared to both U.S. and California averages. The two primary utilities serving the county in 2010—Pacific Gas & Electric Company (PG&E) and Healdsburg Electric—achieved lower emissions by procuring electricity generated by low-carbon and renewable sources, including hydropower, wind, solar, and geothermal.

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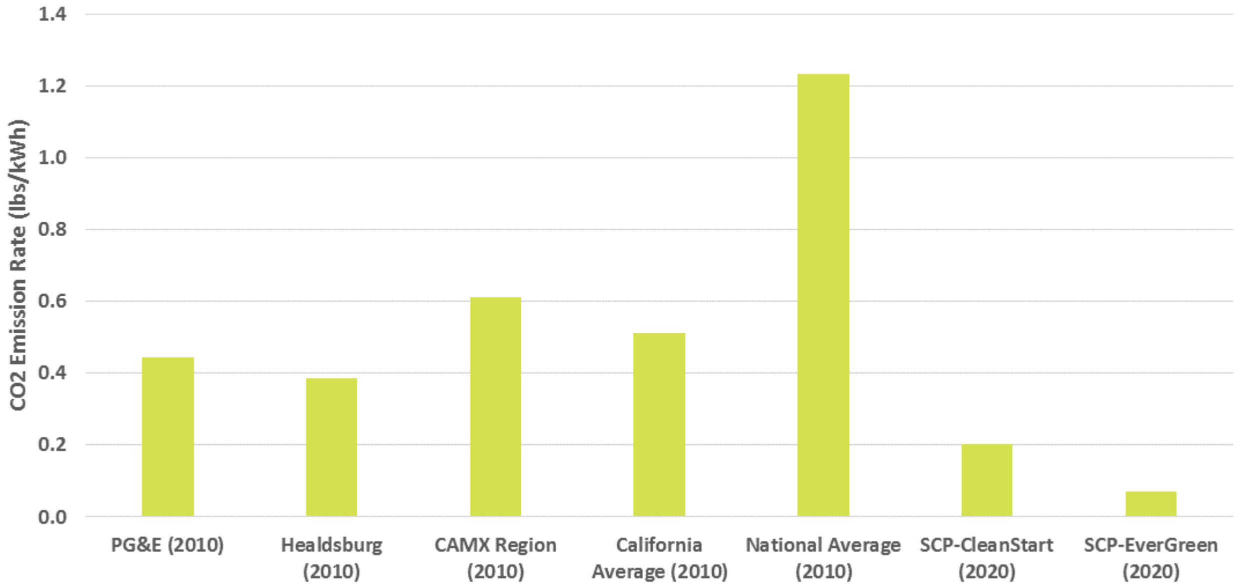
[2] Approximately 6% of homes in the County use these fuels. GHG emissions represent only 1% of total building energy emissions because that source also includes electricity emissions and nonresidential emissions.

**Figure 2-4. CO$_2$ Emissions Factor Comparison by Utility/Region**

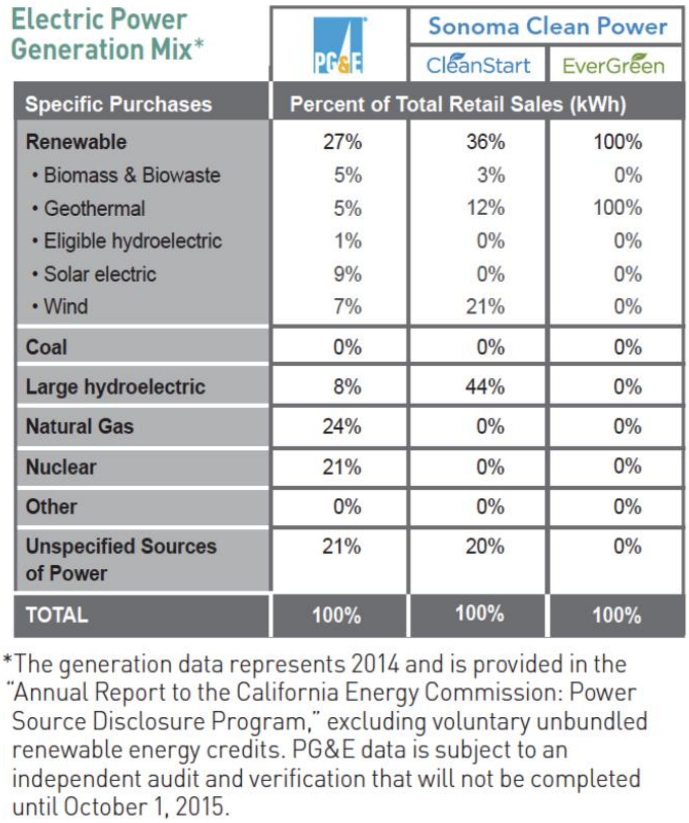


Continued pursuit of zero-carbon electricity sources presents a major opportunity to reduce emissions in Sonoma County. This includes both on-site electricity generation (such as rooftop solar) and reduced- or zero-carbon electricity generation portfolios provided by utilities. Sonoma Clean Power (SCP) was created in 2014 to offer low-carbon and zero-carbon electricity options for homes and businesses in Sonoma County. The predicted GHG intensity of SCP electricity in 2020 is also shown in Figure 2-4. Over time, both PG&E and SCP will pursue increasingly more renewable generation to comply with state climate and energy goals and ultimately surpass those state goals.

The 2014 power mixes for PG&E and SCP are shown in Figure 2-5.

Another opportunity to reduce emissions is presented by reducing or replacing natural gas with on-site photovoltaic (PV) electric generation. SCP, the County of Sonoma Energy and Sustainability Division, and the Northern Sonoma County Air Pollution Control District will be involved in creating the incentives to support this measure.

**Figure 2-5. Comparison of PG&E and SCP 2014 Electric Power Generation Mixes**



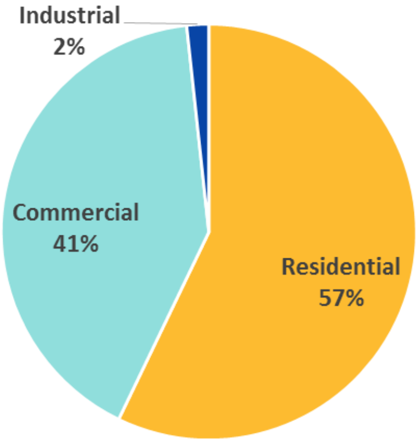
Electric Power Generation Mix*

| Specific Purchases | PG&E | Sonoma Clean Power CleanStart | Sonoma Clean Power EverGreen |
|---|---|---|---|
| | Percent of Total Retail Sales (kWh) | | |
| **Renewable** | 27% | 36% | 100% |
| • Biomass & Biowaste | 5% | 3% | 0% |
| • Geothermal | 5% | 12% | 100% |
| • Eligible hydroelectric | 1% | 0% | 0% |
| • Solar electric | 9% | 0% | 0% |
| • Wind | 7% | 21% | 0% |
| **Coal** | 0% | 0% | 0% |
| **Large hydroelectric** | 8% | 44% | 0% |
| **Natural Gas** | 24% | 0% | 0% |
| **Nuclear** | 21% | 0% | 0% |
| **Other** | 0% | 0% | 0% |
| **Unspecified Sources of Power** | 21% | 20% | 0% |
| **TOTAL** | 100% | 100% | 100% |

*The generation data represents 2014 and is provided in the "Annual Report to the California Energy Commission: Power Source Disclosure Program," excluding voluntary unbundled renewable energy credits. PG&E data is subject to an independent audit and verification that will not be completed until October 1, 2015.

**Building Energy Emissions by End Use.** Different building types use energy for different purposes, with different opportunities to reduce emissions (see Figure 2-6). In 2010, roughly 58% of building energy was used in homes, compared with 42% used in businesses, institutions, and other nonresidential settings.

**Figure 2-6. Building Energy Emissions by End Use**



Residential buildings consume energy for heating, cooling, hot water, lighting, and appliances. Policies and programs to reduce emissions from residential buildings must focus on reducing energy demand through conservation and improvements to building energy efficiency and meeting demand with low- or zero-carbon energy sources.

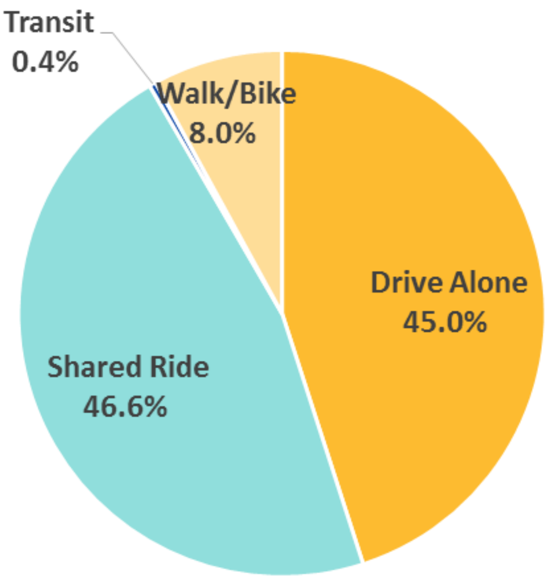
The energy needs of commercial buildings are more diverse. A retail building may have energy needs for lighting and air conditioning, while a hotel may have a very large demand for hot water. Measures to address emissions from nonresidential buildings must be designed with the unique needs of commercial and industrial buildings in mind.

## Existing Emissions from Transportation

On-road transportation is the largest source of GHG emissions for the county; approximately 53% of total countywide emissions are from transportation, or nearly **2 million $MTCO_2e$.** Vehicle trips made by residents and employees within the county are expected to increase as the population and economy grow. Strategies to support alternative modes of transportation, improve transportation efficiency, and reduce vehicle miles traveled are therefore an essential part of CA2020.

**Transportation Emissions by Mode.** In 2010, motorists traveled more than 11 million vehicle miles in Sonoma County each day. These trips were taken primarily in passenger vehicles, with additional trips by commercial vehicles, transit vehicles, and other vehicle types. Figure 2-7 shows a breakdown of daily countywide trips by mode for 2010 for all trip purposes (e.g., home to work, home to school, nonresidential), as provided by the Sonoma County Transportation Authority.

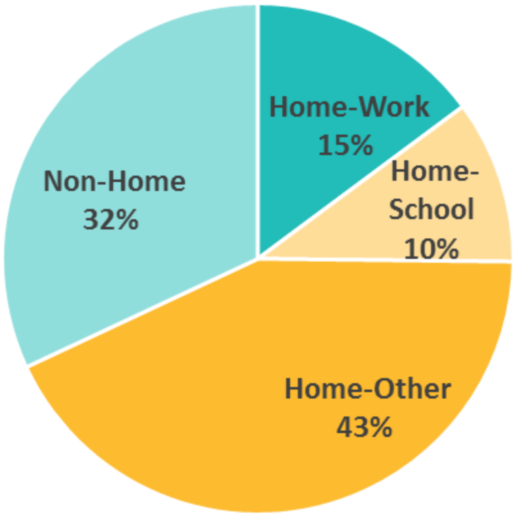
**Figure 2-7. Sonoma County Daily Trips by Mode for 2010**



**Transportation Emissions by Purpose.** Opportunities to reduce emissions from transportation must be based on an understanding of how, why, and where people travel in Sonoma County. The Sonoma County Transportation Authority's Comprehensive Transportation Plan provides a 25-year transportation vision for Sonoma County. Comprehensive Transportation Plan goals include maintaining the current transportation system, reducing traffic congestion, reducing GHG emissions, improving safety and health, and promoting economic vitality. The plan includes bicycle and pedestrian projects, highway and local road infrastructure projects, technology projects (e.g., energy-efficient streetlights and signal timing), smart land use projects, and transit projects.

Most trips in Sonoma County (about 68%) are home-based trips. About two-thirds of these home-based trips are for purposes other than getting to/from work or school. Non-home trips include all trips that do not begin or end at home, including commercial or business-related trips. Figure 2-8 shows a breakdown of daily countywide trips by purpose for 2010, as provided by the Sonoma County Transportation Authority.

**Figure 2-8. Sonoma County Daily Trips by Purpose for 2010**

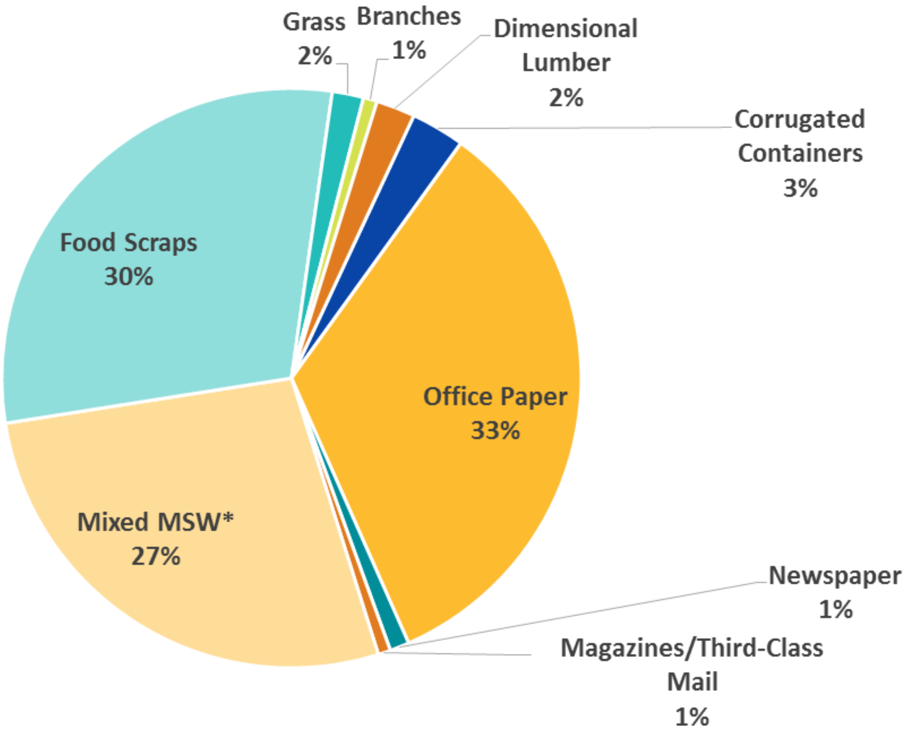


## Existing Emissions from Solid Waste

In 2010, county residents and businesses generated an estimated 1.3 million tons of solid waste, 350,000 tons of which was landfilled, generating about **134,000 $MTCO_2e$** (about 4% of total 2010 emissions). About 58% of this waste comes from commercial sources and 42% from residential sources. Increasing population and employment means more solid waste and associated GHG emissions in the future without further action. Strategies to reduce waste generation, increase waste diversion from landfills (such as through recycling and composting), and increase methane capture are therefore essential parts of CA2020.

Waste landfilled in the county includes a variety of waste categories, such as paper, plastic, glass, and food. Figure 2-9 shows a breakdown of waste emissions by waste type for 2010.

**Figure 2-9. Sonoma County Solid Waste Emissions by Waste Type for 2010**



* "Municipal solid waste" or "MSW" means all solid wastes generated by residential, commercial, and industrial sources, and all solid waste generated at construction and demolition sites, at food-processing facilities, and at treatment works for water and waste water, which are collected and transported under the authorization of a jurisdiction or are self-hauled. Municipal solid waste does not include agricultural crop residues, animal manures, mining waste and fuel extraction waste, forestry wastes, and ash from industrial boilers, furnaces and incinerators (see: http://www.calrecycle.ca.gov/laws/regulations/title14/ch9a3.htm).

## Existing Emissions from Water and Wastewater

In 2010, energy used to convey potable water and treat wastewater resulted in GHG emissions of more than **18,000 MTCO$_2$e** (about 0.5% of total 2010 emissions). County residents and businesses consumed more than 20 billion gallons of water in 2010 and are expected to consume nearly 27 billion gallons by 2020 under BAU conditions, an increase of 28%. This increased water use also means more wastewater generation, resulting in increased GHG emissions in the future without further action. Water resources, including surface and groundwater, are essential parts of the county community and economy. Given the potential for future reductions in water supplies as a result of climate change, water conservation and wastewater treatment are critical strategy areas for CA2020.

The water conveyance emissions include those from large municipal water providers including, but not limited to, the Sonoma County Water Agency (SCWA) wholesale water system, systems operated by SCWA's retail water contractors, and the smaller supplier-produced groundwater providers. Electricity use (and associated emissions) for private domestic and agricultural wells is accounted for in CA2020 under building energy.

**Water Use by Source and End Use.** Water conveyance resulted in approximately 3,600 $MTCO_2e$ of emissions in the county in 2010. These emissions represent energy use for water supply and treatment activities and include SCWA operations, groundwater pumping, and recycled water use. SCWA is a water wholesaler that provides water to retail water contractors (primarily cities and water districts). The 2010 emissions from water conveyance are already lower than they would be otherwise because of SCWA's program to create a zero-carbon water system by 2015. SCWA water contractors provide about 56% of the water supply within the county. End uses of this water include residential, commercial, landscaping, and other uses. Single- and multi-family residential water use represents 68% of all water deliveries by retailers in the county.

Figure 2-10 shows a breakdown of water supply by source for 2010, while Figure 2-11 shows a breakdown of water use by sector for 2010

**Figure 2-10. Sonoma County Water Supply by Source for 2010**

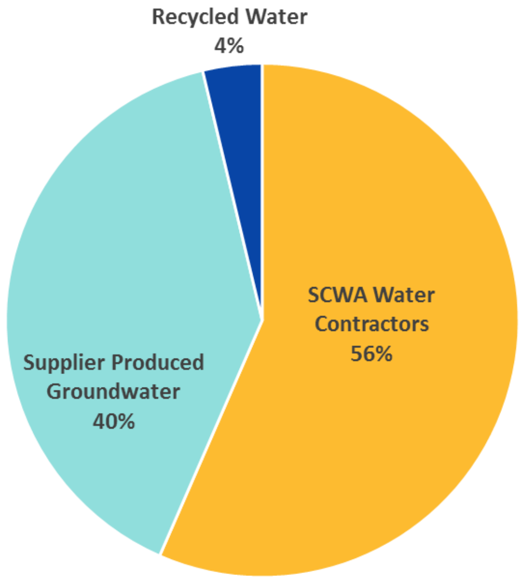
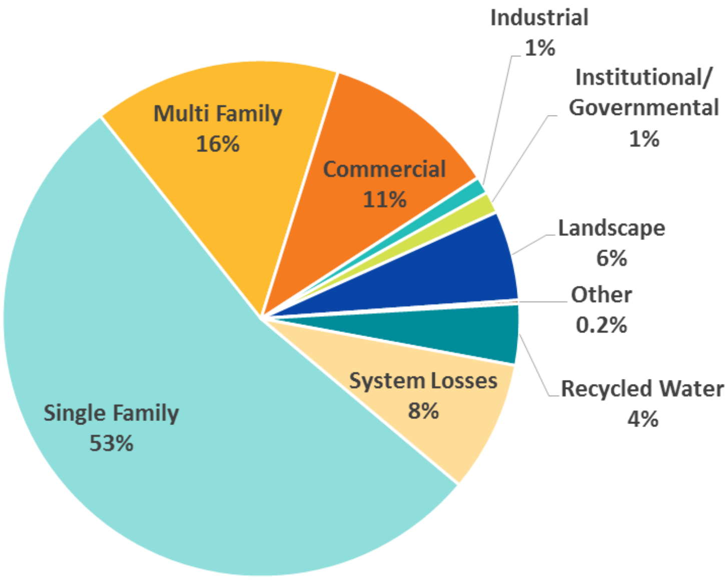
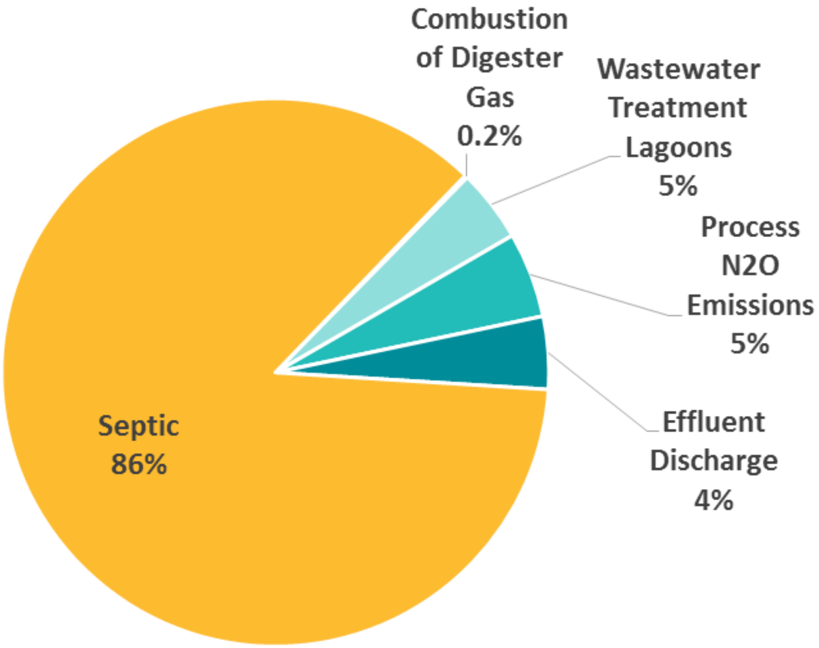


**Figure 2-11. Sonoma County Water Use by Sector for 2010**



**Wastewater Emissions by Source.** Wastewater treatment resulted in approximately 15,000 $MTCO_2e$ of emissions in the county. Wastewater treatment includes a variety of different processes, each of which releases $CH_4$ and $N_2O$ emissions. The majority (86%) of wastewater emissions in the county are from individual septic systems, which serve approximately 24% of the countywide population. Wastewater treatment plants (WWTPs) serve the remaining 76% of the county population, and emissions from WWTPs represent 13% of total wastewater treatment emissions (WWTPs produce fewer emissions per person served than septic systems). Figure 2-12 shows a breakdown of wastewater emissions by source for 2010.

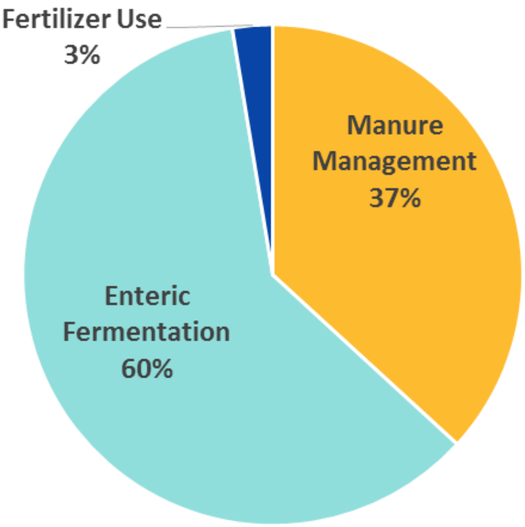
**Figure 2-12. Sonoma County Wastewater Emissions by Source for 2010**



## Existing Emissions from Livestock and Fertilizer

Livestock and fertilizer emissions are the third-largest source of emissions in Sonoma County overall after transportation and building energy, accounting for just over **7% of emissions in 2010** (see Figure 2-13). The primary emissions are $CH_4$ generated by manure storage and enteric (digestive) fermentation and $N_2O$ generated by fertilizer application.

**Figure 2-13. Livestock and Fertilizer Emissions by Source**



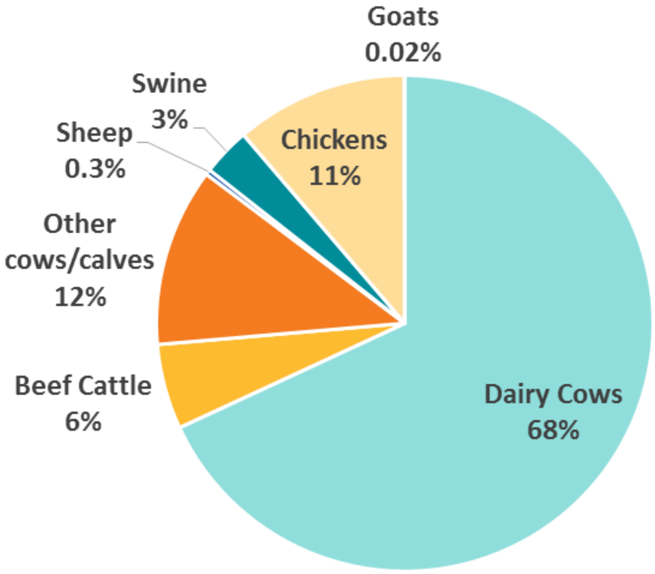
**Methane and Nitrous Oxide from Livestock Operations.** The majority (97%) of emissions from livestock and fertilizer come from livestock operations (mostly dairy cows) (see Figure 2-14). These emissions arise from the management of livestock manure and livestock enteric fermentation (digestion).

Manure creates both $CH_4$ and $N_2O$ as it biodegrades. The amount of $CH_4$ generated varied considerably depending on the type of manure management used. Well-managed pasture systems and aerobic dry composting systems tend to have lower emissions, while anaerobic wet handling systems generate more $CH_4$.

Dairies in Sonoma County are now predominantly organic, which means that dairy cows must spend at least 1/3 of their time in pasture. This trend has reduced emissions from livestock manure. Dairy farmers are also growing more livestock feed on-site, rather than importing feed, which also reduces GHG emissions related to the transportation of imported feed.

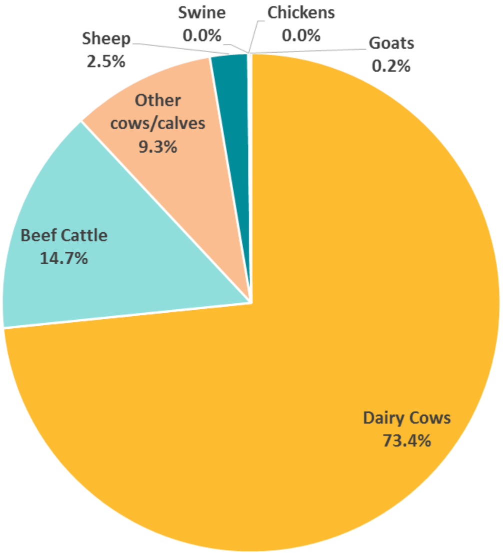
Nonetheless, significant opportunity exists to promote manure management practices that reduce emissions, including practices that rely on anaerobic digesters, dry composting, pasture management and waste-to-energy facilities.

**Figure 2-14. Manure Management Emissions by Livestock Type**



The other major emissions source is enteric fermentation, again mostly from dairy cows (see Figure 2-15). Enteric fermentation is the process of microbial fermentation that produces $CH_4$ during animal digestion (ICLEI – Local Governments for Sustainability 2012).

**Figure 2-15. Enteric Fermentation Emissions by Livestock Type**

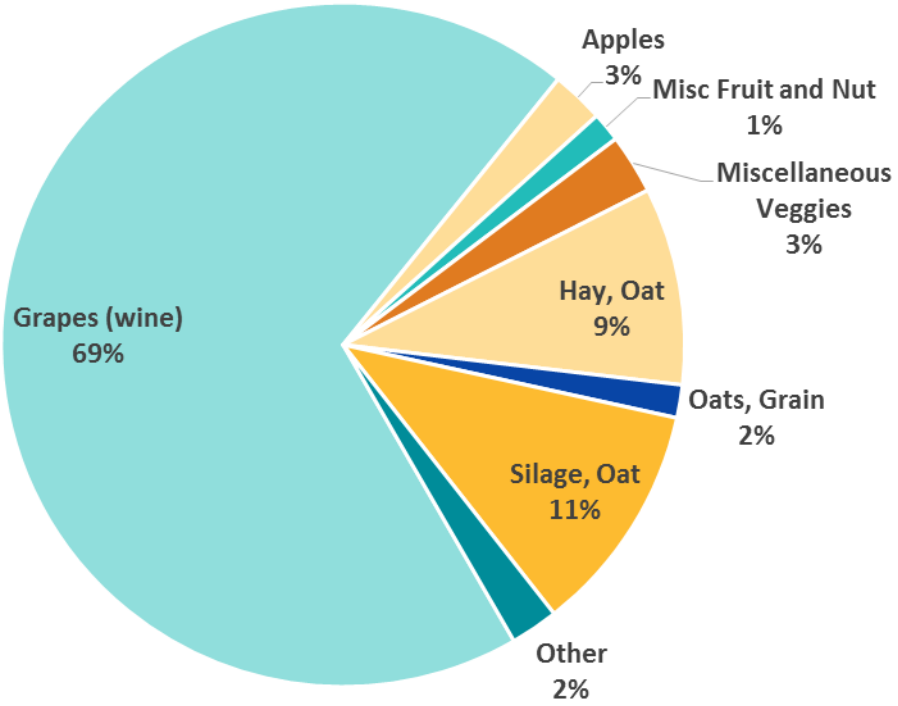


$CH_4$ emissions can be reduced through animal diets that create a digestive environment that is less conducive to methanogens, although opportunities to significantly reduce enteric emissions are currently limited. Such options include dietary oils (e.g., whole cottonseed oil, sunflower oil, coconut oil, palm oil), the use of corn or legume silage in place of grass silage, and the use of concentrate feeds, nitrates, ionophores, and tannins. Improving forage quality and overall efficiency in dietary nutrient use are other options.

**Emissions from Fertilizer Use.** The remainder (3%) of emissions from livestock and fertilizer is mainly from the application of nitrogen-based fertilizers (see Figure 2-15). $N_2O$ is emitted when nitrogen is added to the soil through the use of synthetic fertilizers. Fertilizer application is the largest source of $N_2O$ emissions in the U.S., accounting for about 74% of total U.S. $N_2O$ emissions in 2013 (U.S. Environmental Protection Agency 2015). Different crops use fertilizer at different rates; therefore, the rate of emissions from fertilizers varies by crop type; soil management, including irrigation; and fertilizers used.

Despite having a relatively low rate of fertilizer use, wine grape production in the county is responsible for the majority of $N_2O$ emissions associated with fertilizer use because of the total amount of acreage devoted to wine grapes (see Figure 2-16).

Figure 2-16. Total Fertilizer Emissions by Crop Type



Source: U.S. Department of Agriculture National, Agricultural Statistics Service. 2013. *QuickStats Ad-hoc Query Tool.* Available: http://nassgeodata.gmu.edu/CropScape/. Accessed: November 2013.

### 2.3.2 GHG Emissions in Sonoma County by Jurisdiction

Changes in emissions by jurisdiction over time are a product of a number of factors, including economic and population growth, annexations, urban growth boundaries, an emphasis on city-centered growth, and changes in efficiency, energy sources, and behavior (see Table 2-4).

Forecasts for future growth in emissions by jurisdiction are based on socioeconomic projections developed by each jurisdiction. More discussion of the factors that drive growth (or reductions) in emissions within in each jurisdiction’s boundary over time is provided in Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*.

**Table 2-4. GHG Inventory and Forecast Results by Jurisdiction and Year**

| Jurisdiction | Emissions ($MTCO_2e$) | | | | | |
|---|---|---|---|---|---|---|
| | Backcast | Inventory | BAU Forecasts | | | |
| | 1990 | 2010 | 2015 | 2020 | 2040 | 2050 |
| *Emissions by Jurisdiction* | | | | | | |
| Cloverdale | 57,300 | 59,000 | 69,300 | 73,300 | 93,200 | 93,800 |
| Cotati | 51,500 | 52,100 | 57,300 | 61,300 | 69,000 | 70,900 |
| Healdsburg | 93,500 | 108,800 | 117,000 | 121,000 | 123,700 | 121,100 |
| Petaluma | 387,000 | 441,900 | 505,000 | 543,000 | 580,900 | 588,600 |
| Rohnert Park | 291,300 | 264,300 | 317,400 | 372,700 | 371,800 | 378,600 |
| Santa Rosa* | 1,123,100 | 1,065,200 | 1,338,400 | 1,396,900 | 1,844,700 | 2,027,500 |
| Sebastopol | 73,200 | 76,300 | 85,300 | 93,000 | 96,500 | 97,100 |
| Sonoma | 96,900 | 103,400 | 117,400 | 122,200 | 132,500 | 131,200 |
| Windsor | 133,000 | 157,800 | 178,300 | 188,100 | 212,000 | 216,500 |
| Unincorporated Sonoma County | 1,244,300 | 1,004,500 | 1,065,300 | 1,128,800 | 1,205,600 | 1,218,300 |
| *Emissions Not Assigned to Individual Communities* | | | | | | |
| Fertilizer and Livestock | 392,800 | 267,600 | 254,400 | 242,600 | 193,500 | 169,000 |
| **Sonoma County Total** | **3,944,000** | **3,601,000** | **4,105,000** | **4,343,000** | **4,923,000** | **5,113,000** |

* 2040 and 2050 forecasts for Santa Rosa were derived from the City's CAP. Emissions for each source for the years 2020 and 2035 were linearly extrapolated to 2040 and 2050.

## 2.3.3 How Does This Analysis Differ from Previous Inventories?

The GHG inventories prepared for Climate Action 2020 are the most comprehensive look at community-wide GHG emissions in the county to date. This is the first time that a community-wide measurement for each jurisdiction has been completed across all seven sources. They are also based on the most current emissions factors and methodologies in use for community climate action planning in California. However, this is not the first time emissions have been measured in Sonoma County. Local governments and community-based organizations have been measuring

**Municipal GHG Inventories in Sonoma County:**

In 2002 and 2003, the Sonoma County jurisdictions prepared municipal GHG inventories, with assistance from the Climate Protection Campaign. The Climate Protection Campaign helped the jurisdictions track and reduce emissions from their municipal operations, using a variety of tools, and released annual GHG report cards.

GHG emissions since the early 2000s. Because of differences in protocols, datasets, and emissions factors used, past measurements cannot be compared directly against CA2020 measurements. Nonetheless, they are still important benchmarks in the history of climate action in Sonoma County. The community-wide inventories developed by the Center for Climate Protection (formerly the Climate Protection Campaign) reveal a trend over time that helps show how local climate leadership has influenced local emissions. The inventories prepared by the Center for Climate Protection can be found on its website (http://climateprotection.org/our-work/reports/).

The City of Santa Rosa adopted a community climate action plan in 2012. The inventory developed by Santa Rosa for its CAP was calculated by using the best available data and methodology at the time. Santa Rosa's 2007 baseline inventory provides a foundation for the City's adopted target to reduce emissions to 25% below 1990 levels by 2020 (the City's 1990 emissions estimate was calculated as 15% below the 2007 baseline inventory). Santa Rosa's inventory and estimated GHG reductions through measures in its CAP have been integrated into CA2020 through inclusion of the city's commitments in Chapter 3, *Reducing Community Emissions*, and Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*. An updated 2010 inventory for the City of Santa Rosa is included to give the city more information about progress toward its 2020 target and provide a consistent data set for all jurisdictions. Updated 2020, 2040, and 2050 BAU forecasts for Santa Rosa were not conducted; the forecast values in this document are derived from Santa Rosa's CAP. Emissions for each source for the years 2020 and 2035 were linearly extrapolated to 2040 and 2050.

## 2.4 Other Emissions Sources and Carbon Sinks

The activity-based GHG inventory approach outlined in Section 2.2 does not include all human activities in Sonoma County that drive an increase or decrease in atmospheric GHG emissions. CA2020 does not address every source of emissions; rather, it tries to move the needle on the largest emissions sources that can most directly be influenced by local government action.

- Several categories of emissions and potential emission reductions are separate from the community-wide GHG inventory. Carbon sinks through biological carbon sequestration
- Consumption of goods and services imported into Sonoma County
- Industrial and commercial stationary sources
- Air travel

These additional sources and sinks are explored in the following sections.

### 2.4.1 Biological Carbon Sequestration

**Green infrastructure** is a "cost effective, resilient approach to managing wet weather impacts that provides many community benefits."

**Ecosystem services** are "the many life sustaining benefits we receive from nature—clean air and water, fertile soil for crop production, pollination, and flood control."

U.S. Environmental Protection Agency

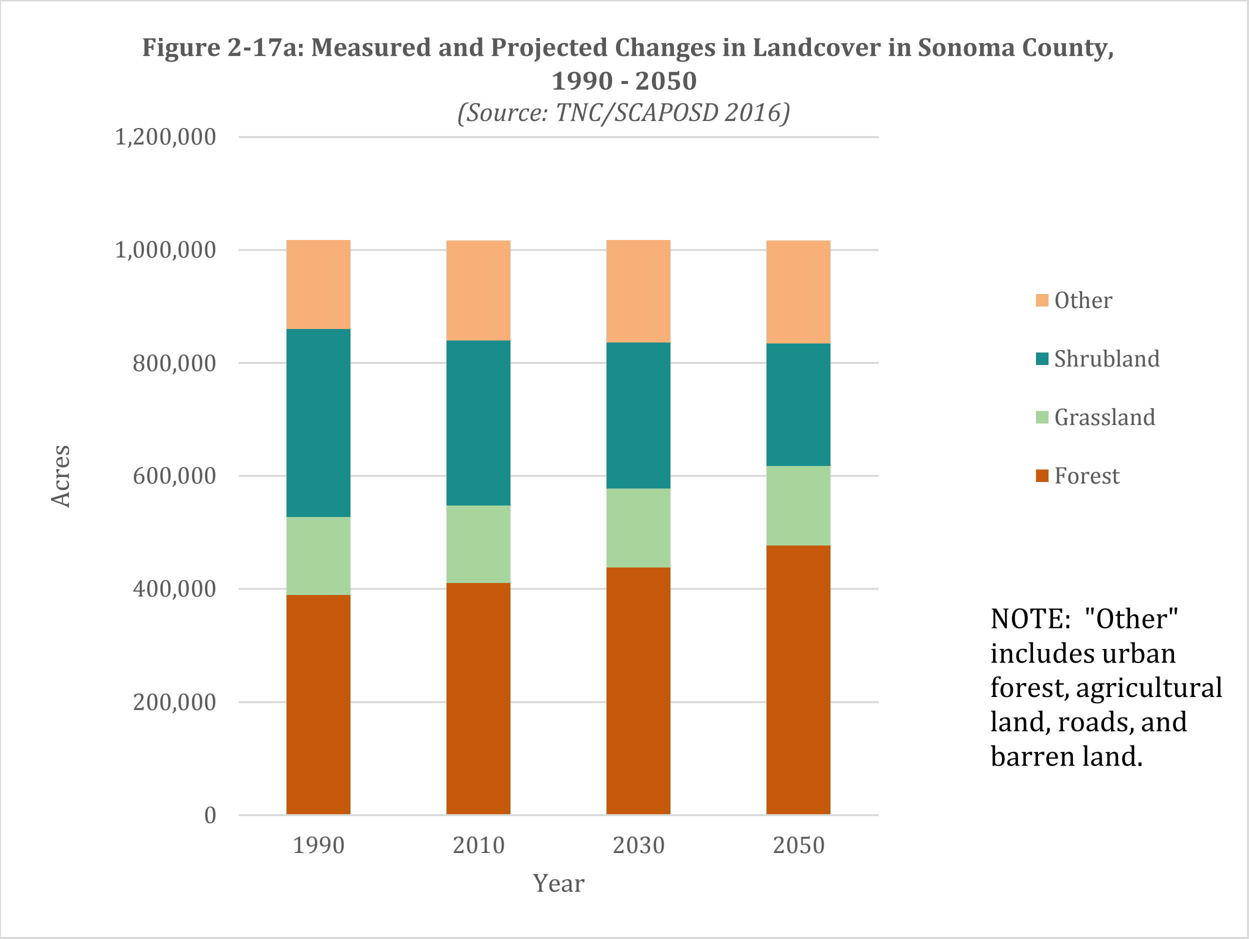
Biological carbon sequestration is the process of removing carbon dioxide from the atmosphere and storing it as carbon (i.e., photosynthesis) in vegetation, such as trees, shrubs and grasses, and soil, thereby reducing atmospheric carbon. Various ecological processes transfer carbon between the atmosphere, vegetation, and the soil, including photosynthesis, respiration, and decomposition. This terrestrial, or biological, sequestration occurs on agricultural lands (including cropland and grazing land), non-agricultural rural lands (including forests and grasslands), and urban forests.

When disturbed through human activities or natural disturbances, stored carbon can be released to the atmosphere. Conversely, natural and working lands can be protected and managed in ways that actually increase carbon sequestration. Thus, sequestering and storing carbon on natural and working lands is essential to reducing carbon in the atmosphere.

Natural and working lands are also essential "green infrastructure" assets because of the many ecosystem services they provide as well as their essential role in a healthy county economy. Many climate readiness objectives are furthered through the preservation and enhancement of natural and working lands, including trees, vegetation, and soils, as outlined in Chapter 6, *Sonoma County Climate Readiness*.

The ICLEI *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions* recommends that emissions sinks (i.e., sequestered carbon) be disclosed but not combined with other emissions created by human activity in an emissions inventory. While estimates of carbon sequestration are not included in the CA2020 inventory, a new report titled *Conserving Landscapes, Protecting the Climate: The Climate Action Through Conservation Project* (CATC) describes a pilot project that, among other things, provides an estimate of carbon stocks in Sonoma County in various land cover categories. (The Nature Conservancy and Sonoma County Agricultural Preservation and Open Space District, 2015). Figures B5 and B6 from the CATC report (shown as Figure 2-17a and Figure 2-17b, below) show total acres by land cover as well as carbon storage estimates for 1990 and 2010 and projections for 2030 and 2050.

### Figure 2-17. Projection of land cover and carbon storage ($CO_2e$) by cover class to 2050[3]



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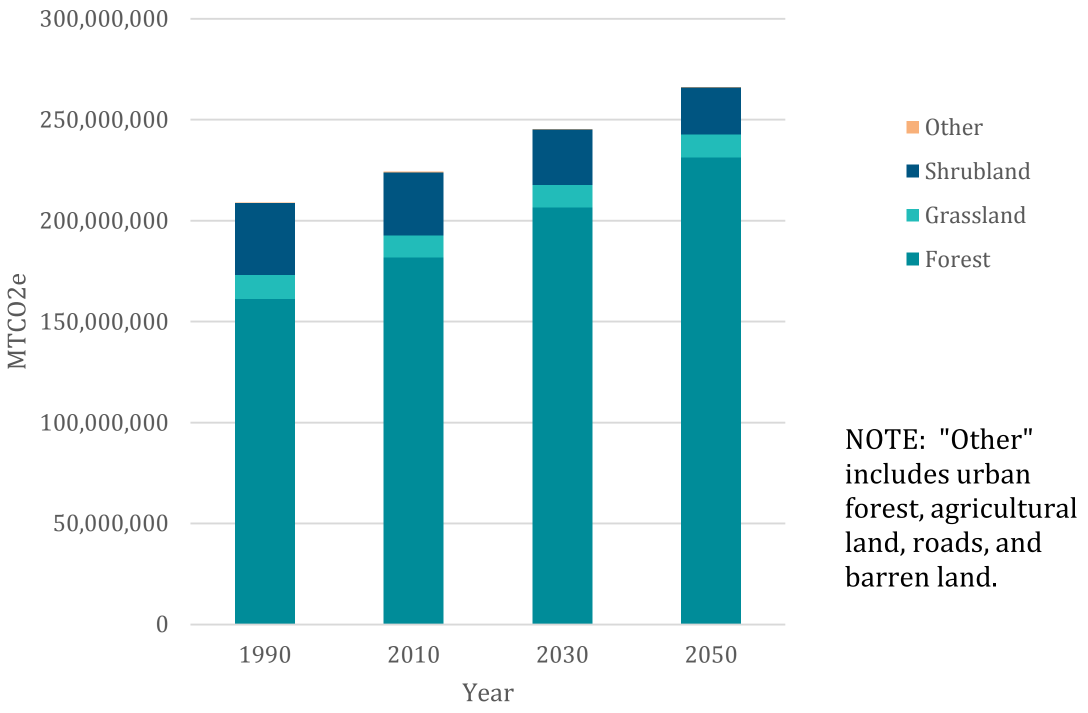
[3] This figure is from the Climate Action Through Conservation Project report. This report can be found at the following link: http://scienceforconservation.org/dl/CATC_Final_Jan2016.pdf

**Figure 2-17b: Measured and Projected Changes in Landscape Carbon Storage in Sonoma County, 1990 - 2050**

*(Source: TNC/SCAPOSD 2016)*



NOTE: "Other" includes urban forest, agricultural land, roads, and barren land.

Although CA2020 focuses on reducing other sources of GHG emissions, Sonoma County is already taking steps to identify how human activities impact biological carbon emissions and support land management and conservation practices that reduce emissions and increase biological carbon sequestration. Indeed, improved baseline storage carbon storage estimates, such as those presented in the CATC pilot project, will ultimately become part of a framework to increase biological carbon sequestration through protection and management of open and working lands and sustainable agricultural practices. The CATC project also describes new tools for analyzing the carbon sequestration effects (positive or negative) of future land use and land management changes and for tracking these changes over time. These tools will ultimately enable land managers and decision makers to estimate the value of conserving natural and working lands in the county, as well as the potential to sequester more carbon through restoration and management. The CATC project will inform future steps that the RCPA and its partners will undertake to meet long-term climate protection goals. See Chapter 3, *Reducing Community Emissions*, for more discussion about how this will be addressed in CAP implementation.

**Sonoma County Vegetation Mapping Project**

The Sonoma County Vegetation & Habitat Mapping Project is a program of the Sonoma County Agricultural Preservation and Open Space District and Sonoma County Water Agency, with contributions from the National Aeronautics and Space Administration, California Department of Fish and Wildlife, United States Geologic Survey, Sonoma County Department of Transportation and Public Works, City of Petaluma, The Nature Conservancy, and the University of Maryland. Products include a fine scale vegetation map for the county, county wide LiDAR, as well as products and tools that document the amount of carbon sequestered in natural and working lands. Sonoma Veg Map (sonomavegmap.org) complements and supports another initiative known as Climate Action Through Conservation (CATC), which provides a way for Sonoma County, other local governments, land managers, and planners to understand the links between climate benefits and conservation values and incorporate that knowledge into decisions about land use and land management.

Many owners and managers of natural and working lands are already implementing practices that increase sequestration and storage of carbon. Examples of practices already being utilized locally include:

- Buffer or Filter Strips
- Compost Application
- Forest Stand Improvement
- Hedgerow or Shelterbelt Planting
- Mulching
- Nutrient/Manure Management
- Reduced or No-Till Farming
- Cover cropping
- Riparian Restoration
- Tree and Shrub Establishment- Windbreaks, Silvopastures
- Wetland Restoration
- Prescribed grazing

**Carbon Farming**

Land management is the second largest contributor to carbon dioxide emissions on planet earth. Agriculture is the one sector that has the ability to transform from a new emitter of $CO_2$ to a net sequesterer of $CO_2$ – there is no other human managed realm with this potential. Common agricultural practices, including driving a tractor, tilling the soil, over grazing, using fossil fuel based fertilizers, pesticides and herbicides result in significant $CO_2$ release. Alternatively, carbon can be stored long term (decades to centuries or more) beneficially in soils in a process called soil carbon sequestration. *Carbon farming* involves implementing practices that are known to improve the rate at which $CO_2$ is removed from the atmosphere and converted to plant material and/or soil organic matter. Carbon farming is successful when carbon gains resulting from enhanced land management and/or conservation practices exceed carbon losses. Preliminary analysis suggests that Carbon Farming can beneficially sequester an average of ***over* 65 metric tons of carbon per acre across 264,693 acres** of agricultural and grazing lands in Sonoma County, potentially resulting in **over 17 million metric tons of additional $CO_2$e removed from the atmosphere**.

Carbon Cycle Institute, 2016

### 2.4.2 Emissions from Consumption of Goods and Services

Consumption-based emissions are approximately double the emissions counted in an activity-based inventory, underscoring the importance of reducing consumption-based emissions to achieve long-term GHG reduction goals. Addressing consumption-based emissions also creates an opportunity to engage a wider range of community members and stakeholders who may not see their impact or their opportunity for action in a purely activity-based approach.

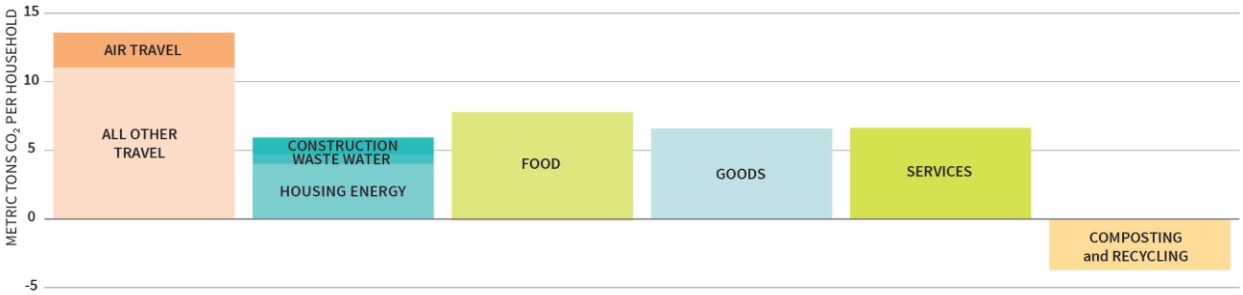
As discussed in the introduction to this Chapter, this CAP uses an activity-based inventory that calculates emissions from human activities within Sonoma County. It does not account for global carbon emissions that result from local consumption of goods and services that are produced outside Sonoma County, though it does include emissions associated with the production of goods that are grown or made in Sonoma County, including those consumed outside the county.

An alternative approach to quantifying GHG emissions is a so-called “consumption-based” inventory, which includes global lifecycle emissions associated with products (including food) and services used in a particular geographic location or population. These inventories include emissions from fuels and materials used in buildings, transportation, and the production of goods and services outside the local area, including food. A consumption-based approach also looks at total product lifecycle and supply chain emissions, including those associated with harvesting or mining raw materials, manufacturing and processing, and transportation to market. It also includes product use, disposal, and degradation. Most importantly for the purposes of this CAP, consumption-based inventories focus primarily on indirect emissions resulting from individual and household choices over which local communities have little direct control, whereas activity-based inventories, like the one included in this CAP, focus on those emissions that a local jurisdiction can more directly influence. While this CAP does not include a consumption-based inventory, Chapter 3 does include measures that will help reduce consumption based emissions in the future.

A recent study (Jones & Kammen, UC Berkeley, 2015) presented the first consumption-based inventory of San Francisco Bay Area neighborhoods, cities and counties. According to the study, consumption-based emissions in 2013 were 44.3 metric tons of $CO_2e$ per household in the Bay Area, compared to 50 metric tons for the average U.S. household. Consumption-based emissions in Sonoma County communities were found to be generally lower than the Bay Area average, ranging from 37.4 to 44.7 metric tons per household. Countywide, consumption-based emissions are estimated at 40.4 metric tons per household, about 10% lower than the Bay Area average.

The consumption-based approach used in the UC Berkeley study accounts for much greater emissions from food, goods and services than the activity-based approach used in this CAP. For example, under the consumption-based approach, food generates 19% of all GHG emissions, roughly 3 times more emissions than household energy use. Likewise, goods and services contribute 18% of total emissions. Accordingly, total Sonoma County emissions under the consumption-based approach were 7.2 MMT $CO_2e$ in 2013 (the inventory year in the UC Berkeley study), compared to 3.7 MMT in the 2010 inventory based on the activity-based approach used in this CAP. Again, with consumption-based emissions approximately double the emissions counted in an activity-based inventory, reducing consumption-based emissions is essential to achieving long-term GHG reduction goals.

**Figure 2-18. Average Household Carbon Footprint in Sonoma County**[4]



Community-based programs like GoLocal Sonoma County already help reduce consumption-based emissions by promoting local goods and services purchases that typically have a smaller carbon footprint. Local communities also have "buy local" preferences for municipal purchases.

Many of the GHG reduction measures included in this CAP will also reduce consumption-based emissions. For example, moving toward 100% renewable electricity (including both utility-scale and distributed generation), combined with electrification of vehicles and heating, will dramatically reduce consumption-based emissions from transportation and building energy. Likewise, land use and transportation measures in this CAP that focus on higher density infill development near transit will also reduce household carbon footprints. In addition, the *Advanced Climate Initiatives* in Chapter 3 include strategies to reduce emissions related to the consumption of food, goods and services as well as land use and sustainable agriculture strategies that focus on retaining and increasing carbon sequestration in soils and vegetation.

Acknowledging that the activity-based approach alone is incomplete is an important step in understanding the underlying causes of global warming and defining opportunities to reduce our contributions.

### 2.4.3 Industrial and Commercial Stationary Sources

Emissions from existing industrial and commercial stationary sources (except for natural gas combustion) are not included in the GHG inventory because the County and cities have limited jurisdictional control over existing large stationary sources. Large, stationary point-source emissions are regulated by the State of California (under Assembly Bill 32 through cap and trade) and through the U.S. Environmental Protection Agency (under the Clean Air Act) for GHG emissions. New stationary source emissions that are also subject to local land use authority could be subject to additional emissions reductions mandated by a local entity. However, any such requirements would need to account for state and federal regulation of such sources before determining if additional reductions are needed. Such determinations are highly source specific, given the complexity of state and federal regulations. As such, the forecasts in CA2020 exclude new industrial and commercial stationary sources. These sources are not covered by CA2020 but would need to be addressed on a case-by-case basis if and when a local land use authority has jurisdiction over such new sources. These sources include combustion of fossil fuels of any type, *except* natural gas (such as diesel, fuel oil, propane, kerosene, wood, digester gas, etc.), and fugitive emissions from industrial processes for each jurisdiction.

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[4] 2015 University of California, Berkeley, study, A Consumption-Based Greenhouse Gas Inventory of San Francisco Bay Area Neighborhoods, Cities and Counties, by Christopher Jones and Daniel Kammen.

Natural gas use from industrial and commercial sources is included as part of the inventory and forecasts for CA2020. Stationary fuel combustion and process emissions associated with fuels other than natural gas were not included because of data limitations as well as concern about duplication of state and federal regulation of such point sources.

### 2.4.4 Emissions from Air Travel

Emissions resulting from air travel are not included in the inventory because of the challenges in determining the origin and/or destination of flights and because Sonoma County communities do not have control over aircraft sources. Regulation of emissions from aircraft occurs at the federal level. Consequently, emissions from air travel are considered out of scope for this inventory.

Although emissions directly produced by aircraft are not included in the inventory, airport-related emissions (such as energy use in airport buildings) in the county are captured in the inventory and forecasts. Emissions from airport building energy and aircraft ground-support equipment are captured under building energy and off-road transportation and equipment, respectively.

# 3. Reductions

## Reducing Community Emissions

# Chapter 3
# Reducing Community Emissions

## 3.1 Introduction

Climate Action 2020 (CA2020) identifies strategies that will reduce regional (countywide) greenhouse gas (GHG) emissions in the near term and put Sonoma County communities on track toward the long-term goals of reducing emissions by 40% below 1990 levels by 2030 and 80% below by 2050. The reduction measures identified in CA2020 support (and actually substantially exceed) the state's 2020 climate protection goals.

GHG reduction measures in CA2020 will be implemented at three levels.

- **State** measures adopted and implemented by state agencies, including statewide fuel efficiency standards and renewable portfolio standards for electricity generation.
- **Regional** measures implemented by cross-jurisdictional agencies like the Regional Climate Protection Authority (RCPA), Sonoma Clean Power (SCP), transit agencies, and waste management and water supply agencies.
- **Local** actions implemented by the cities and the County. These local measures include voluntary, incentive-based, and regulatory approaches.

This chapter explains how, through the implementation of more than 60 state, regional, and local reduction measures, Sonoma County communities can achieve the regional GHG reduction target of 25% below 1990 levels by 2020. Table 3-1 shows how this combination of state, regional, and local measures will meet the reduction target.

**Table 3-1. Achieving Sonoma County's 2020 Greenhouse Gas Reduction Target—Summary**

| Parameter | Emissions ($MTCO_2e$) |
|---|---|
| 2020 Business as Usual (BAU) GHG Emissions Forecast[1] | 4,343,000 |
| 2020 Community Emissions Reduction Target (25% below 1990 levels) | 2,957,900 |
| ***$Total_1$ Reductions Needed to Reach Target*** | ***1,385,100*** |
| 2020 Emissions Reductions from State Measures | 744,100 |
| 2020 Emissions Reductions from Regional Measures | 177,500 |
| 2020 Emissions Reductions from Local Measures (w/Santa Rosa CAP) | 474,800 |
| ***$Total_2$ Emissions Reductions Achieved by Climate Action Strategies*** | ***1,396,400*** |
| 2020 Countywide Emissions under CA2020 | 2,946,600 |
| *Emissions Reductions in Excess of Target ($Total_2$ minus $Total_1$)* | 11,300 |
| [1] 2020 BAU GHG emissions do not include stationary sources | |

In addition to specific measures to achieve the GHG reduction target for 2020, this plan also includes longer-term goals to provide a foundation for even deeper GHG reductions beyond 2020 (see Section 3.2.2). Section 3.2.3 describes several advanced climate initiatives included in this plan to give Sonoma County a head start on achieving those goals.

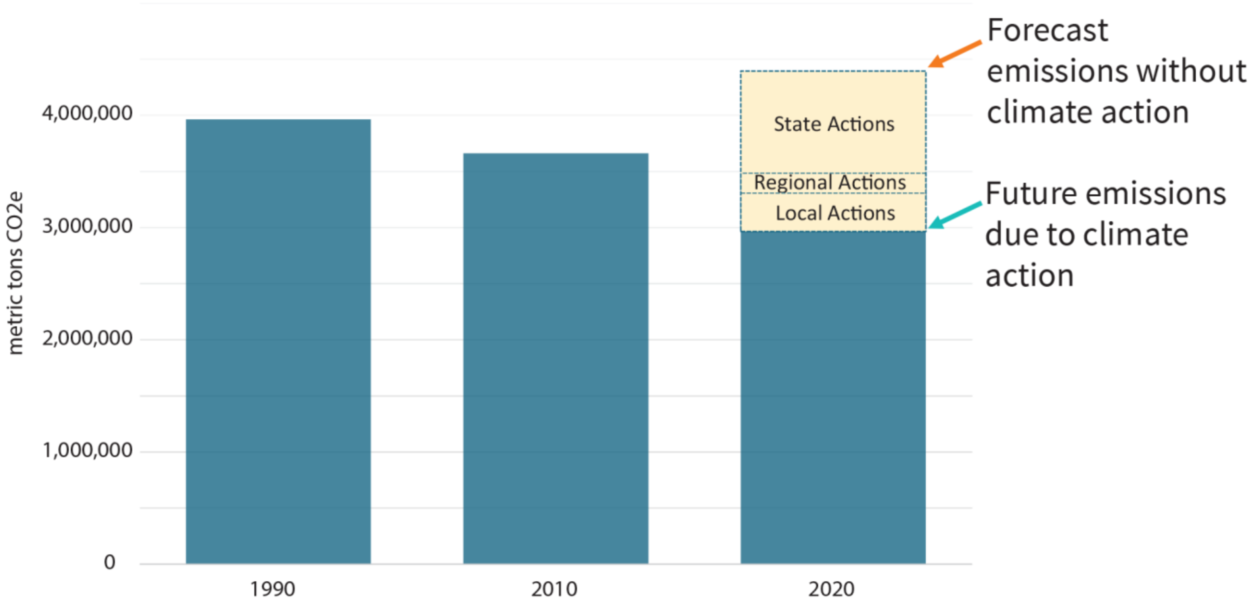
## 3.2 Greenhouse Gas Reduction Target and Goals

### 3.2.1 Climate Action 2020 Target

CA2020 was motivated by a need to identify specific near-term actions to reduce GHG emissions and to establish updated goals for 2020 and beyond. The year 2020 is an important milestone because of California's Global Warming Solutions Act (Assembly Bill [AB] 32), which seeks to reduce statewide GHG emissions down to 1990 levels by 2020. Sonoma County jurisdictions were significantly more ambitious than the state when, in 2006, they adopted a goal of 25% below 1990 levels by 2015. Even though no formal GHG reduction plan was adopted, that ambition has driven positive results: emissions in 2010 were already 7.5% lower than 1990 levels. However, the county is not expected to meet its goal of 25% below 1990 in 2015.

Therefore, Sonoma County jurisdictions have agreed to an updated countywide target of 25% below 1990 levels by 2020, illustrated in Figure 3-1. This goal is ambitious because it is significantly greater than the state's AB 32 2020 target, but it is also achievable through the state, regional, and local GHG reduction measures outlined in this chapter.

**Figure 3-1. Achieving Sonoma County's 2020 Greenhouse Gas Reduction Target**

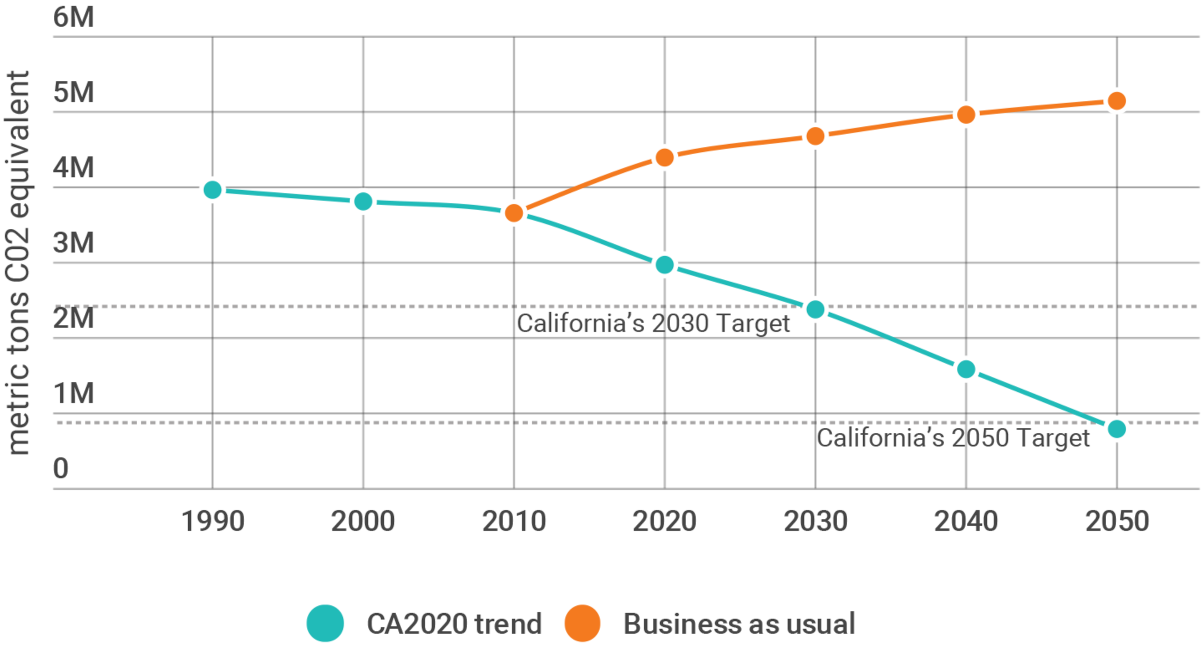


### 3.2.2 Long-Term Goals and Vision

As discussed in Chapter 1, *The Framework for Sonoma County Climate Action*, the scientific consensus about the long-term ramifications of unchecked human-induced climate change has already been integrated into state policy. Governor Schwarzenegger's 2005 Executive Order (EO S-03-05) sets a long-term statewide goal of 80% below 1990 emissions levels by 2050. In order to reach this target, the state will have to go well beyond the steps included in the AB 32 Scoping Plan for 2020. Accordingly, in April 2015, Governor Brown issued Executive Order EO B-30-15 establishing an interim reduction target of 40% below 1990 levels by 2030 and directing the California Air Resources Board to update the AB 32 Scoping Plan to reflect that target. The updated Scoping Plan is expected in late 2016. The state legislature is also considering Senate Bill (SB) 32, which, if adopted, would establish the 2030 goal as a legislative mandate, thus broadening its legal applicability.

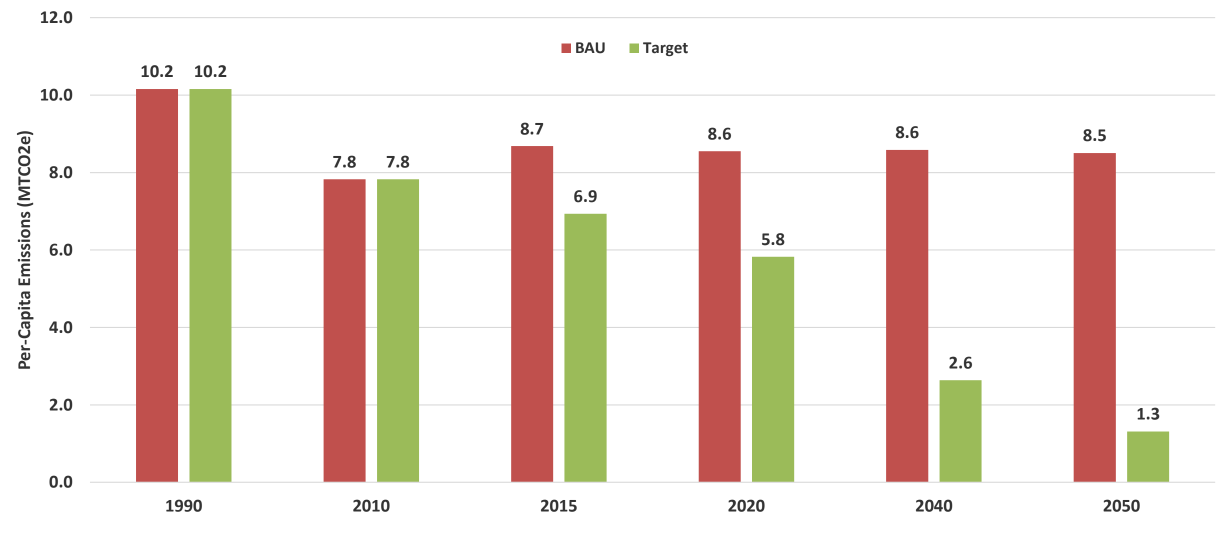
In adopting this CAP, RCPA will also adopt long-term goals to reduce GHG emissions by 40% by 2030 and by 80% by 2050. Although the specific path to reach these goals has not yet been determined—neither locally nor by the State of California—it is clear that pursuing the ambitious 2020 target puts the county on a solid trajectory toward meeting the long-term goals. Figure 3-2 shows that current state GHG reduction measures (e.g., vehicle fuel standards and renewable portfolio standards for electricity) will only achieve a portion of the reductions needed to meet long-term goals. While further state action to reduce emissions is anticipated, success will require scaling up existing local and regional strategies, including those in this Climate Action Plan (CAP), and developing new solutions.

**Figure 3-2. Sonoma County 1990 to 2050 GHG Emissions Pathways**



Another way to look at the long-term challenge is on a per capita basis. As shown in Figure 3-3, countywide GHG emissions were 7.8 metric tons of carbon dioxide equivalent ($MTCO_2e$) per person in 2010 and are forecast to increase to 8.7 $MTCO_2e$ per person by 2015. Projected per-capita business-as-usual (BAU) emissions decrease slightly to 8.6 $MTCO_2e$ in 2020 and beyond because population is projected to increase somewhat faster than emissions. Nonetheless, given projected population and economic growth, meeting the long-term reduction target requires that per capita emissions in 2050 not exceed 1.3 $MTCO_2e$, an even steeper decline than is needed for overall emissions reduction. The County's 2020 target is equivalent to 5.8 $MTCO_2e$ per capita, further emphasizing the challenge of meeting the long-term goals and the importance of adopting an aggressive target of 25% below 1990 levels by 2020 to put the county on the right track to meet the long-term goals.

**Figure 3-3. Sonoma County Per-Capita Emission Targets from 1990 to 2050**



The state has begun evaluating the cost and feasibility of strategies to achieve the long-term targets. For example, in early 2014, the California Air Resources Board, California Energy Commission, California Public Utilities Commission and the state's Independent System Operator, initiated the California PATHWAYS Project to evaluate the feasibility and cost of strategies to meet interim targets on the way to achieving an 80% reduction in GHG emissions by 2050. The PATHWAYS model demonstrates that success is possible based on scaling up the primary strategies in this plan: resource efficiency, zero carbon electricity, and switching away from fossil fuels.

Implementing the local measures in CA2020 will complement state efforts and reduce GHG emissions well beyond 2020. In addition to specific GHG reduction measures, the RCPA and partner agencies will actively lobby state and federal government for programs and funding that to support long-term GHG reduction goals. State and federal support could include funding sources like cap & trade and carbon pricing.

### The California PATHWAYS Project: Long term Greenhouse Gas Reduction Scenarios

To support the 2030 emissions target, the California Air Resources Board, Energy Commission, Public Utilities Commission, and the Independent System Operator commissioned Energy + Environmental Economics (E3) to evaluate the feasibility and cost of potential 2030 targets that would facilitate reaching the state's 2050 goal of 80% below 1990 levels. E3 developed eight emission reduction scenarios described below that demonstrate technically and economically viable scenarios to achieve the 2050 target. E3 conducted the analysis using its California PATHWAYS model, which encompasses the entire California economy with detailed representations of the buildings, industry, transportation, and electricity sectors. The following scenarios would achieve the 2050 target in different ways, with varying costs and benefits.

1. **Reference**: Current GHG policies continue through 2020 only.
2. **Straight Line**: Low carbon technologies including energy efficiency, building electrification, renewable electricity, zero emission vehicles, and renewable liquid fuels.
3. **Early Deployment**: Same technology focus as the Straight Line Scenario with faster deployment of renewable electricity and near term measures with air quality benefits, including zero emission vehicles and electric heat pumps.
4. **Slower Commercial Adoption**: Same technology focus as the Straight Line Scenario, but with delayed implementation of higher cost measures, primarily zero emission vehicles and electric heat pumps in the commercial sector; adoption is accelerated post 2030 to hit 2050 goal.
5. **Low Carbon Gas**: Focus on decarbonized pipeline gas, no renewable liquid fuels, and no building electrification.
6. **Distributed Energy**: Focus on distributed photovoltaic and grid storage.
7. **Carbon Capture and Non Biological Sequestration**: Phase in of natural gas carbon capture and sequestration in electricity generation and hydrogen production post 2030.
8. **High Battery Electric Vehicles**: Focus on battery electric vehicles instead of fuel cell vehicles.

These eight scenarios demonstrate a range of costs—from $40 to $60 billion by 2050—associated with achieving California's emissions goals, illustrating that success in mitigating climate change is possible at reasonable economic costs with proven technologies.

*Source: Energy + Environmental Economics 2015*

However, state action will not be enough by itself; further local action to reduce GHG emissions will also be needed. Future local actions will be guided in part by the state's framework for post-AB 32 climate protection, as well as by lessons learned through the adaptive management approach to implementing CA2020. As noted in Chapter 1, CA2020 is part of a much longer-term effort. To reach long-term goals, a new phase of climate action planning will be needed after 2020 to build upon the goals and strategies in this plan and take advantage of new technologies and climate protection science that are constantly evolving.

A long-term climate action strategy for Sonoma County will most likely include some or all of the following.

By 2030:

- Sonoma County buildings will be 100% carbon neutral to the maximum extent feasible.

- A fully integrated smart power grid will ensure maximum efficiency of energy use through load balancing will compensate when variable energy sources (such as wind and solar) are not available, advanced batteries and other storage, or fossil fuel generation with carbon capture.
- State, regional, and local strategies will drive a 50% improvement in building efficiency in both new and existing buildings.
- Building heating and cooking will shift away from natural gas in favor of renewable electricity sources.
- The California Energy Commission will implement its goals for Zero Net Energy in new residential buildings by 2020 and for new commercial buildings.
- Per capita vehicle miles traveled (VMT) are reduced beyond 2020 through focused growth, increasingly efficient and electrified public transit systems, active transportation, and other mobility strategies.
- State, regional, and local strategies will drive a 50% reduction in petroleum use.
- The widespread adoption of electric vehicles – on the order of 150,000 vehicles – will allow local utilities to meet or exceed the requirement of 50% of electric power to be provided from renewable sources.
- Institutional and technological capacity to integrate distributed energy resources will dramatically improve.

By 2050:

- Electric vehicles (EV) and alternative fuel vehicles will be in use across all vehicle types. Self-driving cars will reduce congestion and improve fuel efficiency.
- Implementation of Moving Forward 2040, the SCTA’s Comprehensive Transportation Plan, will set up a countywide transportation system with 80% lower GHG emissions per capita compared to 1990 levels, the maximum feasible extent of carbon-free transportation. All commercial agricultural properties will be enrolled in certified programs that promote sustainability and natural resource conservation.
- Agricultural soil carbon levels will be substantially higher in 2050 through soil management practices supporting crop development and carbon sequestration.
- There will be zero waste through implementation of diversion, waste reduction, and green energy systems.
- Widespread use of recycled water, greywater, and rainwater catchment will further offset the demand for potable water. Agricultural water users will continue to pioneer lower water use strategies, which may include the use of different crops and/or varietals.
- All wastewater treatment plants will have biogas systems to capture nearly 100% of all methane generated from their operations.

- A consumption-based emissions inventory will be developed and used to guide the actions of public agencies, private businesses and non-governmental entities, and individual county residents to reduce emissions related to consumption of goods and services.

### 3.2.3 Advanced Climate Initiatives

In recognition of the challenges associated with meeting the longer-term GHG reduction goals, CA2020 also includes several Advanced Climate Initiatives that can be started in the near term, but will result in steadily increasing GHG reduction benefits after 2020. These advanced initiatives include reducing emissions related to the consumption of goods and services, including food, as well as land use and sustainable agriculture strategies that focus on retaining and increasing carbon sequestration in soils and vegetation. Although these strategies are known to have GHG benefits, implementation of these strategies will not directly affect the emissions inventoried in CA2020. Moreover, methods to quantify those benefits are still in development and implementation is more complex. For these reasons, CA2020 does not rely on emission reductions from Advanced Climate Initiatives to meet the GHG reduction goal for 2020, and emissions reductions from these initiatives are not quantified at this time. Nonetheless, these advanced initiatives are essential to long-term success and are therefore included in this CAP.

The measures to implement the Advanced Climate Initiatives are listed as Regional Measures in this CAP because regional agencies, like the RCPA, will lead implementation. Nonetheless, the local communities are likely to have an important supporting role with specific measures. For example, the County will likely be involved with measures related to open and working lands, carbon sequestration and sustainable agriculture. Likewise, all local jurisdictions will have a role to play in the measures aimed at reducing emissions from consumption of goods and services.

## 3.3 Overall Greenhouse Gas Reduction Strategy

The CA2020 planning process explored a variety of state, regional, and local measures to reduce GHG emissions to achieve the 2020 target and provide a strong foundation for meeting the 2030 and 2050 goals. Public meetings and online engagement tools were used to collect input on community priorities for climate action. In addition, a 2014 report titled *Proven and Promising Climate Measures from U.S. Communities for Possible Application in Sonoma County*, prepared by the Center for Climate Protection, was used to develop the measures included in CA2020.

The success of the regional GHG reduction strategy described in this chapter depends on committed implementation by the RCPA, other regional agencies and, most importantly, by the local government partners. This CAP identifies five core elements of plan implementation: coordination across many partners; securing funding; engaging the community; monitoring and reporting; and adaptive management. Please see Chapter 4: *Implementation* for detailed information about CAP implementation.

### 3.3.1 GHG Reduction Goals

As a starting point for developing specific GHG reduction measures, Table 3-2 identifies reduction goals for each GHG source. Table 3-3 shows the expected emissions reductions from measures adopted to advance each goal.

**Table 3-2. Greenhouse Gas Reduction Goals**

| Source | Key | Goals |
|---|---|---|
| ***Building Energy*** | | 1. Increase building energy efficiency<br>2. Increase renewable energy use<br>3. Switch equipment from fossil fuel to electricity |
| ***Transportation & Land Use*** | | 4. Reduce travel demand through focused growth<br>5. Encourage a shift toward low-carbon transportation options<br>6. Increase vehicle and equipment fuel efficiency<br>7. Encourage a shift toward low-carbon fuels in vehicles and equipment<br>8. Reduce idling |
| ***Solid Waste*** | | 9. Increase solid waste diversion<br>10. Increase capture and use of methane from landfills |
| ***Water & Wastewater*** | | 11. Reduce water consumption<br>12. Increase recycled water and greywater use<br>13. Increase water and wastewater infrastructure efficiency<br>14. Increase use of renewable energy in water and wastewater systems |
| ***Livestock & Fertilizer*** | | 15. Reduce emissions from livestock operations<br>16. Reduce emissions from fertilizer use |
| ***Advanced Climate Initiatives*** | | 17. Protect and enhance the value of open and working lands<br>18. Promote sustainable agriculture<br>19. Increase carbon sequestration<br>20. Reduce emissions from consumption of goods and services, including food |

## Table 3-3. Achieving Sonoma County's 2020 Greenhouse Gas Reduction Target

| GHG Source and Goal | | GHG Emission Reductions ($MTCO_2e$) |
|---|---|---|
| ***Building Energy*** | | **322,500** |
| 1 | Increase building energy efficiency | 53,877 |
| 2 | Increase renewable energy use | 267,027 |
| 3 | Switch equipment from fossil fuel to electricity | 1,625 |
| ***Transportation and Land Use*** | | **426,000** |
| 4 | Reduce travel demand through focused growth | 4,693 |
| 5 | Encourage a shift toward low-carbon transportation options | 43,058 |
| 6 | Increase vehicle and equipment fuel efficiency | 358,720 |
| 7 | Encourage a shift toward low-carbon fuels in vehicles and equipment | 19,413 |
| 8 | Reduce idling | 163 |
| ***Solid Waste*** | | **65,400** |
| 9 | Increase solid waste diversion | 26,219 |
| 10 | Increase capture and use of methane from landfills | 39,140 |
| ***Water and Wastewater*** | | **22,600** |
| 11 | Reduce water consumption | 19,217 |
| 12 | Increase recycled water and greywater use | 75 |
| 13 | Increase water and wastewater infrastructure efficiency | 759 |
| 14 | Increase use of renewable energy in water and wastewater systems | 2,556 |
| ***Livestock and Fertilizer*** | | **1,800** |
| 15 | Reduce emissions from livestock operations | NQ[1] |
| 16 | Reduce emissions from fertilizer use | 1,759 |
| ***Advanced Climate Initiatives*** | | |
| 17 | Protect and enhance the value of open and working lands | NQ[1] |
| 18 | Promote sustainable agriculture | NQ[1] |
| 19 | Increase carbon sequestration | NQ[1] |
| 20 | Reduce emissions from consumption of goods and services | NQ[1] |
| *Total CAP Reductions* | | **838,300** |
| Santa Rosa CAP Reductions (including applicable state and city reductions) | | 558,080 |
| **Total County 2020 GHG Reductions** | | **1,396,380** |

[1] These measures were not quantified (NQ) for GHG reductions because they are qualitative supporting measures. Refer to Appendix C for more information.

These reductions will be achieved through a combination of existing programs (like Title 24 building energy efficiency standards and statewide clean fuel standards) and new local actions that will be taken by cities and the County. These *Local Measures* are the heart of this countywide CAP because they are the actions that Sonoma County jurisdictions can implement through local initiative.

The following sections describe the specific GHG reduction measures that will accomplish the goals outlined above, organized according to the entity taking action (i.e., state, regional, or local).

## 3.4 State GHG Reduction Measures

The Governor's latest Environmental Goals and Policy Report (2015) identifies the following five pillars to support the state's long-term reduction of climate pollution, protection of public health and stewardship the state's natural resources to support resilience and other environmental benefits:

1. Increasing the share of renewable energy in the State's energy mix to at least 50% by 2030
2. Reducing petroleum use by up to 50% by 2030
3. Increasing the energy efficiency of existing building by 50% by 2030
4. Reducing emissions of short-lived climate pollutants
5. Stewarding natural resources, including forests, working lands, and wetlands, to ensure that they store carbon, are resilient, and enhance other environmental benefits

These five pillars build on the Governor's 2015 executive order establishing a statewide goal of reducing GHG emissions by 40% (compared to 1990 levels) by 2030, and they are fully congruent with the climate protection goals established in this CAP. The first four pillars are focused on reducing GHG emissions related to energy use (transportation and buildings) and short-lived climate pollutants. The fifth pillar emphasizes the importance of natural and working lands, which are addressed as part of the Advanced Climate Initiatives contained in this CAP (see Regional Reduction Measures in Section 3.5). The Governor has also established the "Carbon-Rich, Healthy Soils Initiative" to support carbon sequestration through restoration of soil organic matter in agricultural soils through improved farming practices.

Specific measures implemented by the state of California will address CA2020 goals for two GHG sources: building energy and transportation and land use. State measures for these two sources are listed in Tables 3-4 and 3-5. These measures have already been adopted by state agencies and are under way. A full description of each measure, including the assumptions and methodology used to calculate GHG reductions, is included in Appendix C.

### Table 3-4. State Measures to Reduce Building Energy Emissions

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **Goal 1: Increase building energy efficiency** | | | | |
| **1-S1** | Title 24 Standards for Commercial and Residential Buildings | Requires that new and remodeled buildings be designed to conserve energy and water. | *Developed by:* California Energy Commission (CEC);<br>*Enforced by:* local building departments and the California Building Standards Commission | 14,440 |
| **1-S2** | Lighting Efficiency and Toxics Reduction Act (AB 1109) | Will decrease electricity used for lighting in new buildings through regulation and lighting standards. | *Developed by*: CEC<br>*Enforced by:* CEC | 21,085 |
| **1-S3** | Industrial Boiler Efficiency | Requires an annual tuning of all boilers, or the installation of controls and systems to maximize efficiency. | *Developed by:* California Air Resources Board (ARB)<br>*Enforced by:* ARB and local air districts | 345 |
| **Goal 2: Increase renewable energy use** | | | | |
| **2-S1** | Renewables Portfolio Standard (RPS) | Requires electric utilities (including Pacific Gas & Electric Company [PG&E]), Healdsburg, and Sonoma Clean Power [SCP]) to procure an increasing amount of their electricity from eligible renewable sources up to 33% by 2020. | *Developed by:* California Public Utilities Commission (CPUC)<br>*Enforced by:* CPUC | 181,793 |
| **2-S2** | Residential Solar Water Heater Program (AB 1470) | Provides incentives to encourage the installation of solar water heating systems. | *Developed by:* CPUC<br>*Enforced by:* CPUC | 800 |

## Table 3-5. State Measures to Reduce On-Road Transportation and Off-Road Equipment Emissions

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **Goal 6: Increase vehicle and equipment fuel efficiency** | | | | |
| **6-S1** | Pavley Emissions Standards for Passenger Vehicles and the Low-Carbon Fuel Standard | Will increase the efficiency of automobiles and light-duty trucks by 30%, compared with 2002 efficiency, by 2016. This also includes the Low-Carbon Fuel Standard for on-road vehicles. | *Enforced by:* ARB<br>*Implemented by:* ARB, vehicle manufacturers, and fuel producers | 333,030 |
| **6-S2** | Advanced Clean Cars | Requires that vehicle manufacturers increase the average fuel efficiency of their new vehicles, beyond the Pavley requirements. | *Enforced by:* ARB<br>*Implemented by:* ARB and vehicle manufacturers | 9,679 |
| **6-S3** | AB 32 Vehicle Efficiency Measures | Increases the efficiency of vehicles through proper tire inflation, aerodynamic efficiency for heavy-duty vehicles, hybrid technology for heavy-duty vehicles, and other measures. | *Enforced by:* ARB<br>*Implemented by:* ARB, vehicle service facilities, and vehicle manufacturers | 16,010 |
| **Goal 7: Encourage a shift toward low-carbon fuels** | | | | |
| **7-S1** | Low-Carbon Fuel Standard: Off-Road | Requires a minimum 10% reduction in the carbon intensity of transportation fuels sold in California by 2020. | *Enforced by:* ARB<br>*Implemented by:* ARB and fuel producers | 5,182 |

## 3.5 Regional GHG Reduction Measures

Measures implemented by regional entities and programs will address CA2020 goals in four GHG sources: building energy, transportation and land use, solid waste, and water and wastewater. Regional measures for these four sources are listed below in Tables 3-6 through 3-9. Most of these measures have already been adopted by regional entities and are already underway; RCPA is expected to lead and support the development of any new or enhanced regional measures. A full description of each measure, including the assumptions and methodology used to calculate GHG reductions, is included in Appendix C.

The regional measures (cross jurisdictional efforts in Sonoma County) in this CAP also help support climate protection efforts in the larger Bay Area region, such as the *2016 Clean Air Plan/Regional Climate Protection Strategy* now underway at the Bay Area Air Quality Management District. The District's strategy prioritizes actions to: 1) reduce GHG emissions in agriculture through management of animal waste and improved soil management; and 2) preserve and maximize carbon sequestration on working lands in the Bay Area. The updated Clean Air Plan is expected to propose several "control measures" for agriculture and working lands, including support for carbon farming, carbon sequestration on working lands, and expand dairy digesters.

Regional measures also include measures focused on the four goals under the advanced climate initiatives (Goals 17 through 20) because the RCPA and other regional agencies are well-positioned to support innovation and pilot programs in these areas. However, as these measures are developed and implemented, the local jurisdictions will have opportunities to participate in and advance these goals. Table 3-10, below, presents the regional measures.

**Table 3-6. Regional Measures to Reduce Building Energy Emissions**

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **Goal 1: Increase building energy efficiency** | | | | |
| **1-R1** | Community Energy Efficiency Retrofits for Existing Buildings | Includes all existing programs to improve the energy efficiency of community buildings (including homes and businesses) through retrofits such as Energy Upgrade California, PACE Financing, utility incentives, and technical assistance. | *Implemented by:* Energy Independence Office, RCPA, SCP | 3,954 |
| **1-R2** | Expand Community Energy Efficiency Retrofits Program | Expand programs to promote energy efficiency in existing residential buildings and commercial buildings, and remove barriers for energy efficiency improvements. Includes accelerating participation in existing programs and pursuing innovation through efficiency efforts including: on-bill repayment programs like Windsor PAYS, energy disclosure programs like Home Energy Score, community based campaigns, and others. | *Implemented by:* Energy Independence Office, RCPA, SCP | 12,394 |
| **Goal 2: Increase renewable energy use** | | | | |
| **2-R1** | Community Choice Aggregation | SCP is a community choice aggregation program and electricity provider that works with PG&E to provide their customers between 33% and 100% renewable energy. SCP also supports local renewable energy generation (e.g., solar or wind) through its *NetGreen* program. | *Implemented by:* SCP | 47,995 |
| **Goal 3: Switch Equipment from fossil fuel to electricity** | | | | |
| **3-R1** | Stationary Fuel Switching Incentives | Will provide incentives and financing options for fuel switching from fossil fuel use to electricity. | *Implemented by:* SCP, Sonoma County Energy Independence Office, RCPA, Bay Area Air Quality Management District (BAAQMD), Northern Sonoma County Air Pollution Control District (NSCAPCD) | 1,022 |

## Table 3-7. Regional Measures to Reduce On-Road Transportation and Off-Road Equipment Emissions

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **Goal 5: Encourage a shift toward low-carbon transportation options** | | | | |
| **5-R1** | Improve and Increase Transit Service | Increase bus service, implement bus preferential treatments, implement bus rapid transit and/or express service, improve transit marketing, and improve transit amenities. | *Implemented by:* SCTA, Golden Gate Transit, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus | 147 |
| **5-R2** | Supporting Transit Measures | Implement measures designed to improve the county's transit system. | *Implemented by:* SCTA, Golden Gate Transit, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus | NQ[1] |
| **5-R3** | Sonoma-Marin Area Rail Transit (SMART) | Ensure policies support planned SMART corridor, such as transit-oriented development at planned SMART stations, future local transit planning for SMART, and pedestrian and bicycle facilities to connect to SMART stations. | *Implemented by:* SMART and local jurisdictions with SMART stations | NQ[1] |
| **5-R4** | Trip Reduction Ordinance (TRO) | Develop and implement a mandatory TRO for employers with 50+ employees by offering pre-tax transit expenses, transit or vanpool subsidy, free or low-cost shuttle, or an alternate trip reduction benefit. The TRO will also include a non-trip reduction alternative, in the form of purchase of an equivalent amount of GHG offsets, for employers choosing not to implement trip reductions. | *Implemented by:* SCTA | 6,113 |
| **5-R5** | Supporting Measures for the Transportation Demand Management (TDM) Program | Implement TDM measures to support the TRO. | *Implemented by:* SCTA | NQ[1] |

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **5-R6** | Reduced Cost Transit Passes | Provide reduced cost transit passes to encourage commuters to take transit. If this measure is made mandatory by a jurisdiction, then the measure will also include a non-trip reduction alternative in the form of purchase of an equivalent amount of GHG offsets. | *Implemented by:* SCTA, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus | 5,660 |
| **5-R7** | Alternative Travel Marketing and Optimize Online Service | Conduct countywide marketing efforts (and consistent community-wide efforts) to provide information on alternate travel modes. | *Implemented by:* SCTA, SMART, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus | 4,528 |
| **5-R8** | Safe Routes to School | Create safe routes to school programs for communities where they currently do not exist. | *Implemented by:* SCTA | 14,234 |
| **5-R9** | Car-sharing Program | Build on the work that the Sonoma County Spare-the-Air Resources Team has already conducted to implement a car-sharing program. | *Implemented by:* SCTA | NQ[1] |
| **5-R10** | Bike Sharing Program | Create a countywide Public Bike Share Program to encourage a shift from automobiles to bicycle use. | *Implemented by:* SCTA | NQ[1] |
| **Goal 7: Encourage a shift toward low-carbon fuels in vehicles and equipment** | | | | |
| **7-R1** | Shift Sonoma County (Electric Vehicles [EV]) | Countywide EV promotion program, in partnership with SCP. | *Implemented by:* RCPA, SCTA, and SCP | 11,353 |
| **7-R2** | Alternative Fuels for Transit Vehicles | Replace diesel and gasoline buses with hybrid buses, compressed natural gas buses, or electric buses. | *Implemented by:* SCTA, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus | 40 |

[1] These measures were not quantified (NQ) for GHG reductions because they are either qualitative supporting measures (e.g., 5-R2) or they are already incorporated into the BAU forecasts (e.g., 5-R3). Refer to Appendix C for more information. Supporting measures are measures that cannot currently be quantified and included in the reduction analysis but are provided to strengthen the quantified measures. Although emissions reductions have not been quantified for these measures, they are still an important part of the CAP and ensure a comprehensive approach to climate action planning. Further development and implementation of these measures may result in sufficient data to quantify the GHG reductions in the future.

### Table 3-8. Regional Measures to Reduce Solid Waste Emissions

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **Goal 9: Increase solid waste diversion** | | | | |
| **9-R1** | Waste Diversion Goal | Increase the diversion rate of the total waste stream. | *Implemented by:* Sonoma County Waste Management Agency (SCWMA) with cooperation from RCPA and local jurisdictions | 26,217 |
| **Goal 10: Increase capture and use of methane from landfills** | | | | |
| **10-R1** | Increase Landfill Methane Capture and Use for Energy | Develop new waste-to-energy projects at landfills. | *Implemented by:* SCWMA, landfill owners/operators | 39,140 |

### Table 3-9. Regional Measures to Reduce Water and Wastewater Emissions

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **Goal 11: Reduce Water Consumption** | | | | |
| **11-R1** | Countywide Water Conservation Support and Incentives | Sonoma County Water Agency (SCWA) will continue to work with its water contractors and others to incentivize local water conservation and water-use efficiency measures. | *Implemented by:* SCWA, supported by local jurisdictions | NQ[1] |
| **Goal 12: Increase recycled water and greywater use** | | | | |
| **12-R1** | Recycled Water | Use recycled water instead of potable water. | *Implemented by:* Water/wastewater service providers | 48 |
| **Goal 13: Increase water and wastewater infrastructure efficiency** | | | | |
| **13-R1** | Infrastructure and Water Supply Improvements | Reduce energy demand from water supply infrastructure, investigate new water supply sources, and increase local water production. | *Implemented by:* SCWA and other water/wastewater service providers | 230 |
| **13-R2** | Wastewater Treatment Equipment Efficiency | Reduce energy demand from wastewater treatment operations. | *Implemented by:* Wastewater service providers | 529 |
| **Goal 14: Increase use of renewable energy in water and wastewater systems** | | | | |
| **14-R1** | Sonoma County Water Agency Carbon-Free Water by 2015 | SCWA has contracted to procure 100% of its electricity needs through renewable and carbon-free resources, thus achieving a carbon-neutral electricity supply. | *Implemented by:* SCWA | 2,145 |

[1] These measures were not quantified (NQ) for GHG reductions because they are qualitative supporting measures. Refer to Appendix C for more information. Supporting measures are measures that cannot currently be quantified and included in the reduction analysis but are provided to strengthen the quantified measures. Although emissions reductions have not been quantified for these measures, they are still an important part of the CAP and ensure a comprehensive approach to climate action planning. Further development and implementation of these measures may result in sufficient data to quantify the GHG reductions in the future.

## Table 3-10. Advanced Climate Initiative Measures

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **Goal 17: Protect and Enhance the Value of Open and Working Lands** | | | | |
| **17-R1** | Conserve Open Space and Working Lands | Preserve natural open space and working lands to prevent loss of carbon stock due to conversion of such lands to urban uses or other land use changes that also drive increased vehicle miles traveled. | *Implemented by:* Sonoma County Agricultural Preservation and Open Space District (SCAPOSD) working with other agencies (including cities and the County) and non-governmental partners | NQ[1] |
| **17-R2** | Enhance Natural Resources on Open and Working Lands through Climate Beneficial Management Practices | Continue to work to enhance the natural resources of open and working lands, including agricultural and timber lands. | *Implemented by:* Resource Conservation Districts and partners | NQ[1] |
| **Goal 18: Promote Sustainable Agriculture** | | | | |
| **18-R1** | Sustainable Agriculture Certification Programs | Support sustainable agriculture certification programs that reduce GHG emissions and/or enhance carbon stocks or increase sequestration. | *Implemented by:* Collaborative effort with agriculture groups, the County, and agriculture-related agencies | NQ[1] |
| **18-R2** | Promote Local, Sustainable Food and Ag Products | Support local farmer's markets to provide communities with sustainable local food. | *Implemented by:* jurisdictions with support from regional entities | NQ[1] |

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions ($MTCO_2e$/year) |
|---|---|---|---|---|
| **18-R3** | Urban Agriculture | Amend zoning codes to allow urban farming and gardens in appropriate areas. | *Implemented by:* cities and the county with support from regional entities such as the University of California (UC) Cooperative Extension | NQ[1] |
| **Goal 19: Increase Carbon Sequestration** | | | | |
| **19-R1** | Carbon Farming | Increase carbon sequestration on croplands and working rangelands by adding soil organic material and other measures. Support increasing availability of local compost. | *Implemented by:* The County, Resource Conservation Districts, Natural Resources Conservation Service, and the SCAPOSD | NQ[1] |
| **19-R2** | Establish a Target for Increased Carbon Sequestration | Work with local partners to establish short- and long-term targets for increasing carbon sequestration throughout the County. | *Implemented by:* RCPA, the County, Resource Conservation Districts, Natural Resources Conservation Service, the SCAPOSD, and partners | NQ[1] |
| **Goal 20: Reduce Emissions from Consumption of Goods and Services** | | | | |
| **20-R1** | Measure and Track Consumption-based Emissions | Develop metrics and tools to analyze and track carbon intensity of goods and services consumed in Sonoma County. | *Implemented by:* RCPA with support from the SCWMA | NQ[1] |
| **20-R2** | Educate Consumers | Provide information to residents and businesses about the carbon content of goods and services consumed in Sonoma County with emphasis on options that will reduce GHG emissions. | *Implemented by:* RCPA with support from the SCWMA | NQ[1] |

| Number | Name | Description | Responsible Entities | 2020 GHG Reductions (MTCO$_2$e/year) |
|---|---|---|---|---|
| **20-R3** | Encourage and Promote Sustainable Consumption | Develop and provide resources that help residents get the goods and services they need with the least full life-cycle GHG emissions. | *Implemented by:* RCPA | NQ[1] |
| **20-R4** | Reduce carbon intensity of product supply chains | Explore partnerships and seek opportunities to support local businesses reducing the carbon intensity of their supply chain. | *Implemented by:* RCPA | NQ[1] |

[1] These measures were not quantified (NQ) for GHG reductions because they will not directly affect the emissions inventoried in CA2020. Refer to Appendix C for more information. Although emissions reductions have not been quantified for these measures, they are still an important part of the CAP and ensure a comprehensive approach to climate action planning. Further development and implementation of these measures may result in quantifying these GHG reductions in the future.

## 3.6 Local GHG Reduction Measures

The local GHG reduction measures are presented here in greater detail because these are the new and enhanced actions that Sonoma County local governments—the cities and the County—will contribute toward meeting the ambitious countywide GHG reduction target for 2020. Table 3-11 below provides an at-a-glance listing of all local measures, including which jurisdictions are implementing each measure and anticipated GHG reductions. Table 3-11 includes the City of Santa Rosa, which adopted their Climate Action Plan (CAP) in June 2012. Check marks indicate similar measures between CA2020 and Santa Rosa's CAP, showing how well Santa Rosa's CAP works with CA2020 and contributes to greenhouse gas emissions reductions to help meet local reduction targets. Following the table, the measures are organized by GHG source and presented in more detail, including implementation information, Key Progress Indicators, and community co-benefits.

Please see Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*, for additional information about existing actions, plans, and policies for each jurisdiction. A complete description of each measure, including the assumptions and methodology used to calculate GHG reductions, is included in Appendix C.

**Table 3-11. Local GHG Reduction Measures**

| # | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate | | | | | | | | | | 2020 GHG Reductions (MTCO$_2$e/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma | |
| | **Goal 1. Increase building energy efficiency** | | | | | | | | | | | | | |
| **1-L1** | Expand the Green Building Ordinance Energy Code | Require new residential and nonresidential development to exceed CALGreen Tier 1 voluntary standards by complying with CALGreen Tier 2 standards. | Points beyond Title 24 | - | - | - | - | - | - | - | - | 10 | - | 62 |
| **1-L2** | Outdoor Lighting | Adopt outdoor lighting standards in the zoning ordinance to reduce electricity consumption above and beyond the requirements of AB 1109. | (% of outdoor lighting) | - | 50% | 80% | 50% | 50% | ✓ | 25% | 80% | 25% | 20% | 1,550 |
| **1-L3** | Shade-Tree Planting | Expand on current urban tree-planting policies and programs to establish a shade-tree planting goal for each jurisdiction. | (# of trees) | 100 | 100 | 100 | 1,000 | 1,000 | ✓ | 400 | 50 | 500 | 1,000 | 45 |

| # | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate | | | | | | | | | | 2020 GHG Reductions (MTCO$_2$e/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma | |
| **1-L4** | Co-Generation Facilities | Encourage co-generation facilities to supply a certain amount of energy in new commercial and industrial facilities greater than 100,000 square feet. | (MWh) | - | - | - | - | - | ✓ | - | - | - | 10 | 1 |
| | **Goal 2. Increase renewable energy use** | | | | | | | | | | | | | |
| **2-L1** | Solar in New Residential Development | Implement solar energy installation requirements for new residential buildings to increase renewable energy generation. | % of new development | - | 50% | 8% | 50% | 15% | ✓ | 100% | 8% | 25% | - | 248 |
| **2-L2** | Solar in Existing Residential Buildings | Incentivize solar energy installation for existing residential buildings to increase renewable energy generation. | % of existing homes | 5% | 15% | 2% | 15% | 15% | ✓ | 15% | 11% | 15% | 15% | 9,942 |
| **2-L3** | Solar in New Nonresidential Developments | Implement solar energy installation requirements for new nonresidential development to increase renewable energy generation. | % of new nonresidential development | - | 10% | 2% | 10% | 10% | ✓ | 75% | 2% | 5% | - | 535 |

| # | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate | | | | | | | | | | 2020 GHG Reductions (MTCO$_2$e/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma | |
| **2-L4** | Solar in Existing Nonresidential Buildings | Incentivize solar energy installation for existing nonresidential development to increase renewable energy generation. | % of existing nonresidential development | 10% | 15% | 2% | 20% | 10% | ✓ | 25% | 2% | 25% | 25% | 25,714 |
| | **Goal 3. Switch equipment from fossil fuel to electricity** | | | | | | | | | | | | | |
| **3-L1** | Convert Building Equipment to Electricity | Replace residential natural gas water and space heating equipment with high efficiency electric equipment. | % of households | - | - | 1% | 10% | 5% | ✓ | 10% | - | 10% | - | 603 |
| | **Goal 4. Reduce travel demand through focused growth** | | | | | | | | | | | | | |
| **4-L1** | Mixed-Use Development in City Centers and along Transit Corridors | Identify specific areas for transit-oriented, city-centered, mixed-use development, focusing on identified existing and planned transit corridors. | % of growth to result in mixed use | 15% | 70% | 20% | 60% | 20% | ✓ | 60% | 50% | 50% | 20% | 3,494 |

| # | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate | | | | | | | | | | 2020 GHG Reductions (MTCO$_2$e/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma | |
| **4-L2** | Increase Transit Accessibility | Encourage new residential projects consisting of 25 units or more to be located within 0.5 mile of a transit node, shuttle service, or bus route with regularly scheduled daily service. | % of growth to be 25+ units | 5% | 15% | 20% | 15% | 75% | ✓ | 15% | 15% | 15% | - | 1,057 |
| **4-L3** | Supporting Land Use Measures | Undertake actions that will support transportation-related land use. | Yes/No | Yes | Yes | Yes | Yes | Yes | ✓ | Yes | Yes | Yes | Yes | NQ[1] |
| **4-L4** | Affordable Housing Linked to Transit | Provide affordable housing developments near transit corridors, transit hubs, and downtown cores. | % of new development to be affordable | 15% | 15% | 15% | 15% | 15% | ✓ | 20% | 20% | 15% | - | 142 |

| # | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate |  |  |  |  |  |  |  |  |  | 2020 GHG Reductions (MTCO$_2$e/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma |  |
|  | **Goal 5. Encourage a shift toward low-carbon transportation options** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **5-L1** | Local Transportation Demand Management (TDM) Program | Implement support for voluntary TDM measures for employers with 49 employees or fewer, voluntary TDM measures for larger employers that are in excess of the TRO, and requirements for TDM measures in larger new residential projects. | % of employees eligible | 38% | 38% | 20% | - | 38% | ✓ | 38% | - | - | 38% | 2,975 |
| **5-L2** | Carpool Incentives and Ride-Sharing Program | Create or promote a countywide ride-sharing program and encourage participation by local employers through their TDM programs. | % of employees eligible | 71% | 78% | 25% | - | 78% | ✓ | 78% | - | - | 78% | 5,709 |
| **5-L3** | Guaranteed Ride Home | Create a guaranteed ride-home program to provide a free car-share, shuttle, or taxi ride home to employees in case of an emergency. | Yes/No | Yes | Yes | No | No | No | ✓ | Yes | No | No | Yes | NQ[1] |

|  | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate |  |  |  |  |  |  |  |  |  | 2020 GHG Reductions (MTCO₂e/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma |  |
| **5-L4** | Supporting Bicycle/ Pedestrian Measures | Implement local actions to support bicycle use and pedestrians. | Yes/No | Yes | Yes | Yes | Yes | Yes | ✓ | Yes | Yes | Yes | Yes | NQ[1] |
| **5-L5** | Traffic Calming | Implement traffic-calming measures in downtown cores, accident hot-spot locations, near schools and libraries, etc. | % of trips affected | 90% | 100% | 50% | 100% | 100% | ✓ | 100% | 80% | 100% | 100% | 1,205 |
| **5-L6** | Parking Policies | Implement additional parking policies to promote a reduction in single-occupancy vehicle travel. | % of area affected | 10% | - | 50% | - | - | ✓ | - | - | - | 10% | 2,489 |
| **5-L7** | Supporting Parking Policy Measures | Implement actions to support parking policies, such as prioritized parking for EVs, carpools, and hybrids. | Yes/No | Yes | Yes | Yes | Yes | No | ✓ | Yes | Yes | Yes | Yes | NQ[1] |
|  | **Goal 7. Encourage a shift toward low-carbon fuels in vehicles and equipment** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **7-L1** | Electric Vehicle (EV) Charging Station Program | Develop local charging stations to support EVs. | # of charging stations | 2 | 5 | 20 | 5 | 5 | ✓ | 5 | 3 | 50 | 5 | 60 |

| # | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate | | | | | | | | | | 2020 GHG Reductions ($MTCO_2e$/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma | |
| **7-L2** | Electrify Construction Equipment | Incentivize replacement of fossil-fuel construction equipment with alternatively fueled or electric equipment. | % of equipment | - | 10% | 10% | 10% | - | ✓ | 10% | 5% | 5% | - | 386 |
| **7-L3** | Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | Encourage use of more efficient equipment and support equipment conversion to alternative fuels with lower GHG intensity | Yes/No | Yes | Yes | Yes | Yes | Yes | ✓ | Yes | Yes | Yes | Yes | 2,392 |
| | **Goal 8. Reduce idling** | | | | | | | | | | | | | |
| **8-L1** | Idling Ordinance | Limit idling of all commercial vehicles to 3 minutes, except as necessary for the loading or unloading of cargo within a period not to exceed 30 minutes. | Minutes below state law | 2 | 2 | 2 | 2 | 2 | ✓ | 2 | 2 | - | 2 | NQ[1] |
| **8-L2** | Idling Ordinance for Construction Equipment | Adopt an ordinance that limits idling time to 3 minutes for heavy-duty construction equipment. | Minutes below state law | - | - | - | 2 | 2 | ✓ | 2 | - | - | 2 | 163 |

| # | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate | | | | | | | | | | 2020 GHG Reductions (MTCO$_2$e/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma | |
| | **Goal 9. Increase solid waste diversion** | | | | | | | | | | | | | |
| **9-L1** | Create Construction and Demolition Reuse and Recycling Ordinance | Implement goal for construction and demolition waste. | % beyond baseline | 3% | 3% | 0% | 3% | 0% | ✓ | 3% | 0% | 0% | 3% | 5 |
| | **Goal 11. Reduce water consumption** | | | | | | | | | | | | | |
| **11-L1** | SB X7-7 – Water Conservation Act of 2009 | Meet or exceed water use reduction goal, as identified by SB X7-7 (20% reduction in urban per capita use by 2020). | Per capita water savings goal | 20% | 20% | 20% | 20% | 37% | ✓ | 20% | 10% | 15% | 12% | 16,540 |
| **11-L2** | Water Conservation for New Construction | Require adoption of the voluntary CALGreen Tier 1 water efficiency measures for new residential and nonresidential construction. | % of new residential/ nonresidential development | 0%/ 0% | 0%/ 0% | 0%/ 0% | 100%/ 50% | 100%/ 50% | ✓ | 100%/ 50% | 50%/ 50% | 100%/ 50% | 0%/ 0% | 252 |

|  |  |  |  | In-place/Adopted by or Participation Rate |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Name | Description | Participation Rate Selection | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma | 2020 GHG Reductions (MTCO₂e/yr) |
| **11-L3** | Water Conservation for Existing Buildings | Incentivize renovation of existing buildings to achieve higher levels of water efficiency; encourage existing buildings to retrofit with CALGreen Tier 1 water efficiency measures. | % of new residential/ nonresidential development | 0%/ 0% | 0%/ 0% | 0%/ 0% | 25%/ 50% | 25%/ 50% | ✓ | 25%/ 50% | 25%/ 10% | 25%/ 10% | 0%/ 0% | 2,425 |
|  | **Goal 12. Increase recycled water and greywater use** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **12-L1** | Greywater Use | Incentivize greywater use instead of potable water for residential non-potable uses. | % greywater goal | 0% | 0% | 1% | 2% | 0% | ✓ | 25% | 2% | 0% | 10% | 26 |
|  | **Goal 14. Increase use of renewable energy in water and wastewater systems** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **14-L1** | Green Energy for Water Production and Wastewater Processing in Healdsburg and Cloverdale | Healdsburg will use 100% renewable energy for a certain percentage of its water production and/or conveyance. Cloverdale has implemented solar energy arrays at the city water and wastewater plants. | Yes or N/A | Yes | N/A | Yes | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 412 |

| # | Name | Description | Participation Rate Selection | In-place/Adopted by or Participation Rate |  |  |  |  |  |  |  |  |  | 2020 GHG Reductions (MTCO$_2$e/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Cloverdale | Cotati | Healdsburg | Petaluma | Rohnert Park | Santa Rosa | Sebastopol | Sonoma | Windsor | County of Sonoma |  |
|  | **Goal 15. Reduce Emissions from Livestock Operations** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **15-L1** | Livestock Manure Management | Encourage voluntary manure management techniques that reduce emissions from the decomposition of manure at dairies | Yes or N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Yes | NQ1 |
| **15-L2** | Reduce Emissions from Enteric Fermentation | This voluntary measure would encourage dairies and livestock operations to explore ways to reduce GHG emissions from enteric fermentation. | Yes or N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Yes | NQ1 |
|  | **Goal 16. Reduce Emissions from Fertilizer Use** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **16-L1** | Optimize Fertilizer Use | Encourage voluntary agricultural practices that reduce or eliminate the need for fertilizer (especially synthetic fertilizer) | Yes or N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Yes | 1,759 |

[1] These measures were not quantified (NQ) for GHG reductions because they are qualitative supporting measures. Refer to Appendix C for more information. Supporting measures are measures that cannot currently be quantified and included in the reduction analysis but are provided to strengthen the quantified measures. Although emissions reductions have not been quantified for these measures, they are still an important part of the CAP and ensure a comprehensive approach to climate action planning. Further development and implementation of these measures may result in sufficient data to quantify the GHG reductions in the future.

# *Expand the Green Building Ordinance Energy Code*

## *1-L1*

### Supports CA2020 Goal 1: Increase Building Energy Efficiency

### *GHG Reduction Potential: 62 MTCO$_2$e per year*

Require new development to exceed CALGreen Title 24 standards through Tier 1 voluntary standards (15% reduction from 2010 Title 24 standards) or Tier 2 (30% reduction from 2010 Title 24 standards), or another percentage beyond Title 24. Extend this requirement to apply to future updates to the Title 24 code until zero net energy is achieved through state building standards. Incorporate green building principles and practices into the planning, design, construction, management, renovation, operations, and demolition of all new buildings.

### Community Co-Benefits

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### Implementation:

Each jurisdiction would be responsible for developing and implementing a new Green Building Ordinance (GBO) consistent with the goals chosen as part of this measure.

### Measure Commitments:

Each jurisdiction will adopt a percentage beyond Title 24 as part of an updated GBO.

### Key Progress Indicators:

1. Energy consumption
2. Energy savings
3. The number of new homes and businesses compliant with new GBOs

# *Outdoor Lighting*

**1-L2**

## Supports CA2020 Goal 1: Increase Building Energy Efficiency

## *GHG Reduction Potential: 1,550 MTCO$_2$e per year*

Adopt outdoor lighting standards to reduce electricity consumption above and beyond the requirements of AB 1109. Replace a certain percentage of incandescent outdoor lighting with light-emitting diode (LED) bulbs by 2020.

### Community Co-Benefits

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### Implementation:

Implementation mechanisms will be chosen by each jurisdiction and may include developing a new ordinance requiring LED outdoor lighting for new development and/or providing incentives for bulb replacement in existing fixtures.

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### Measure Commitments:

Each jurisdiction will adopt a goal for the percent of outdoor lighting to be replaced with high efficiency LEDs, between 20% and 80%.

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### Key Progress Indicators:

1. Energy consumption
2. Energy savings
3. The number of LED outdoor lights installed/sold

---

# *Shade-Tree Planting*

**1-L3**

## Supports CA2020 Goal: 1 Increase Building Energy Efficiency

*GHG Reduction Potential: 45 MTCO$_2$e per year*

Expand on current urban tree planting policies and programs to establish a shade tree planting goal for each jurisdiction to help reduce building energy use. The communities already have different tree planting programs that vary by location. Urban tree planting (sometimes called "urban forestry") also increases carbon sequestration by adding additional biomass, although this benefit is not quantified.

### Community Co-Benefits

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### Implementation:

Implementation mechanisms may include:

- Establishing goals and funding sources for new trees planted on city/County property
- Implementing a requirement to account for trees removed and planted as part of new construction
- Requiring new development to plant shade trees (e.g., a certain number of new trees per dwelling unit, new resident, square footage of building, or size of lot)
- Providing rebates for the purchase of new trees and education about the benefits of shade trees and tree care for residents.

---

### Measure Commitments:

Each jurisdiction will adopt a goal for the number of new trees planted by 2020, between 50 and 1,000.

---

### Key Progress Indicators:

1. Energy consumption
2. Energy savings
3. The number of trees planted

---

# *Co-Generation Facilities*

## *1-L4*

**Supports CA2020 Goal 1: Increase Building Energy Efficiency**

*GHG Reduction Potential: 1 $MTCO_2e$ per year*

Optimize the use of locally generated energy by encouraging, where feasible, co-generation facilities in new commercial and industrial facilities greater than 100,000 square feet. The jurisdictions will encourage co-generation facilities through a number of actions, such as amending ordinances, removing regulatory barriers, providing financial incentives, and providing outreach.

### Community Co-Benefits

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### Implementation:

Implementation mechanisms in each jurisdiction could include developing new ordinances or offering incentives for co-generation facilities. For example, a GBO may include LEED certification credits (or other GBO compliance mechanisms) for the use of co-generation. The jurisdictions could offer financial incentives for combined heat and power system development by securing funding available through partnerships with utilities, state and federal government programs (e.g., tax credits, rebates, grants, low-interest loans), energy performance contracts, and non-profit organizations. The communities can also encourage cogeneration by removing any unintended regulatory barriers, such as standard interconnection requirements, net metering, and output-based regulations (U.S. Environmental Protection Agency 2014b). The communities would need to identify land uses that would be appropriate for this measure, and then conduct outreach efforts that explain new ordinances or incentives that are being offered.

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### Measure Commitments:

Each jurisdiction will adopt a goal for installation of new combined heat and power capacity.

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### Key Progress Indicators:

1. The number of co-generation projects
2. The capacity (kilowatt) and generation (kilowatt-hours) for each new combined heat and power system facility

# *Solar in New Residential Development*

**2-L1**

**Supports CA2020 Goal 2:** **Increase Renewable Energy Use**

***GHG Reduction Potential:*** ***248 $MTCO_2e$ per year***

Implement a requirement to install solar energy systems on new residential buildings to increase local renewable energy generation. Under this measure, the jurisdictions will also encourage or require solar installations on as many new multi-family developments as feasible.

### Community Co-Benefits

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## Implementation:

This could be implemented through discretionary approvals and permitting for new projects. This program may also include streamlined permitting, providing information to homeowners for low-interest financing, assisting homeowners in purchasing solar photovoltaics through low-interest loans or property tax assessments, requiring that new development provide for solar access and build solar-ready features into buildings, and establishing guidelines for solar development. The jurisdictions may encourage solar installation by forming partnerships with Sonoma Clean Power, Pacific Gas & Electric Company (PG&E), and other private sector resources, or other solar lease or power purchase agreement (PPA) companies. The communities would be responsible for implementing this measure through coordination with relevant entities, such as PG&E, PPA companies, and solar financing organizations. The actual market penetration rates that each jurisdiction will achieve will likely be influenced by how the community implements this measure. For example, adopting an ordinance to require solar in all new housing would result in a 100% participation rate. Alternatively, a jurisdiction may rely on voluntary solar installation using the technical resources, funding sources, and financing options discussed above. In this approach, participation rates would increase to the extent that funding is available, most likely resulting in less than a 100% participation rate.

---

## Measure Commitments:

Each jurisdiction will adopt a goal for the percentage of new homes installing solar by 2020, between 8% and 100%.

---

## Key Progress Indicators:

1. The number of residential photovoltaic (PV) installations
2. PV electric generation capacity
3. Actual PV electric generation

---

# *Solar in Existing Residential Buildings*

## *2-L2*

### Supports CA2020 Goal: 2 Increase Renewable Energy Use

*GHG Reduction Potential: 9,942 $MTCO_2e$ per year*

Incentivize solar energy installation on existing residential buildings to increase renewable energy generation.

### Community Co-Benefits

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### Implementation:

This could be implemented through the permitting process for major remodels and through incentives for existing homes. The jurisdictions could require solar installation on all existing homes that undergo major remodels. This program may also include streamlined permitting, providing information to homeowners for low-interest financing, assisting homeowners in purchasing solar photovoltaics through low-interest loans or property tax assessments, and establishing guidelines for solar development. Funds may be provided through the Property Assessed Clean Energy (PACE) Financing Marketplace options available through the County of Sonoma. The jurisdictions may encourage solar installation by forming partnerships with PG&E and other private sector funding sources including SunRun, SolarCity, or other solar lease or PPA companies. The jurisdictions would be responsible for implementing this measure through coordination with relevant entities, such as PG&E, PPA companies, and solar financing organizations.

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### Measure Commitments:

Each jurisdiction will adopt a goal for the percentage of existing homes installing solar by 2020, between 2% and 15%.

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### Key Progress Indicators:

1. The number of PV installations on existing homes
2. PV electric generation capacity
3. Actual PV electric generation

# *Solar in New Nonresidential Developments*

## 2-L3

**Supports CA2020 Goal:** Increase Renewable Energy Use

***GHG Reduction Potential:*** *535 MTCO$_2$e per year*

Implement a requirement to install solar energy systems on new nonresidential development to increase local renewable energy generation. Under this measure, the jurisdictions will encourage or require solar installations on as many new nonresidential developments as feasible.

### Community Co-Benefits

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### Implementation:

This could be implemented through discretionary approvals and permitting for new projects. This program may also include streamlined permitting, providing information to developers for low-interest financing, assisting developers in purchasing solar photovoltaics through low-interest loans or property tax assessments, requiring that new development provide for solar access and build solar-ready features into buildings, and establishing guidelines for solar development. The jurisdictions may encourage solar installation by forming partnerships with Sonoma Clean Power, PG&E and other private sector funding sources, or other solar lease or PPA companies. The communities would be responsible for implementing this measure through coordination with relevant entities, such as PG&E, PPA companies, and solar financing organizations. The actual market penetration rates that each community will achieve will likely be influenced by how the jurisdiction implements this measure. For example, adopting an ordinance to require solar in all new nonresidential development would result in a 100% participation rate. Alternatively, an ordinance with building-size thresholds, such as an ordinance that requires solar only for buildings greater than a certain square footage, would result in a lower participation rate.

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### Measure Commitments:

Each community will adopt a goal for the percentage of new nonresidential projects installing solar by 2020, between 2% and 75%.

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### Key Progress Indicators:

1. The number of nonresidential PV installations
2. PV electric generation capacity
3. Actual PV electric generation

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# *Solar in Existing Nonresidential Buildings*

## *2-L4*

**Supports CA2020 Goal 2: Increase Renewable Energy Use**

***GHG Reduction Potential: 25,714 MTCO$_2$e per year***

Incentivize solar energy installation for existing nonresidential buildings to increase renewable energy generation.

### Community Co-Benefits

### Implementation:

This measure could be implemented through discretionary approvals and permitting for existing projects as well as incentives for nonresidential buildings outside the permitting process. The jurisdictions can require all existing buildings that undergo major remodels or renovations to install solar. This program may also include streamlined permitting, providing information to developers for low-interest financing, assisting developers in purchasing solar photovoltaics through low-interest loans or property tax assessments, and establishing guidelines for solar development. Funds may be provided through the Property Assessed Clean Energy (PACE) Financing Marketplace available through the County of Sonoma. The jurisdictions may encourage solar installation by forming partnerships with PG&E and other private sector funding sources including SunRun, SolarCity, or other solar lease or PPA companies. The communities would be responsible for implementing this measure through coordination with relevant entities, such as PG&E, PPA companies, and solar financing organizations.

### Measure Commitments:

Each jurisdiction will adopt a goal for the percentage of existing nonresidential buildings installing solar by 2020, between 2% and 25%.

### Key Progress Indicators:

1. The number of nonresidential PV installations
2. PV electric generation capacity
3. Actual PV electric generation

# *Convert to Building Equipment to Electricity*

## *3-L1*

**Supports CA2020 Goal 3:** **Switch Equipment from Fossil Fuel to Electricity**

*GHG Reduction Potential:* *603 $MTCO_2e$ per year*

Replace residential natural gas space and water heating equipment with high efficiency electric systems, such as air or ground source heat pumps. This measure shifts the energy source from a relatively high GHG-intensive source (natural gas) to a lower GHG-intensive source—clean electricity.

### Community Co-Benefits

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### Implementation:

Implementation mechanisms in each jurisdiction could include developing ordinances to require high efficiency electric equipment for new development or implementing incentives for installing electric equipment in existing buildings. The communities would need to develop outreach efforts to increase community awareness about the status of electric equipment and the life cycle cost and efficiency benefits relative to older, inefficient resistance heating technologies.

### Measure Commitments:

Each jurisdiction will adopt a goal for the percentage of homes replacing natural gas furnaces or water heaters with efficient electric systems, between 1% and 10%.

### Key Progress Indicators:

1. Energy consumption
2. Energy savings
3. The number of electric heating systems installed

# *Mixed-Use Development in City Centers and along Transit Corridors*

**4-L1**

**Supports CA2020 Goal:** **Reduce Travel Demand through Focused Growth**

***GHG Reduction Potential:*** ***3,494***

The jurisdictions would focus new residential and commercial development in their city centers and along existing and planned transit corridors. Mixed-use development (such as residential use above commercial uses) in such locations would improve the diversity of nearby land uses and facilitate easier access to retail and commercial destinations. Improving the jobs/housing balance would also facilitate access to work destinations. Development adjacent to transit centers and along active transit corridors (commonly called *transit-oriented development* or TOD) would increase the amount of trips that can be completed via transit instead of personal vehicles.

## Community Co-Benefits

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## Implementation:

The jurisdictions will develop appropriate tools for cities and urbanized unincorporated areas to encourage mixed-use, infill, TOD, and economic development intended to serve local residents. The primary method will be through updated General Plans and Specific Plans and associated land use designations and site zoning. Policies could include updating zoning codes and improving transit and shuttle service in areas targeted for mixed-use development as well as supporting economic development geared toward local residents to reduce travel for goods and services. The communities would promote and apply existing policies and incentives to further encourage mixed-use, infill, and TOD. Potential incentives could include reduced parking requirements, reductions in building and permit fees, density increases, and other related items.

---

## Measure Commitments:

Each community will set a goal for percentage of new development that results in mixed use, between 15% and 70%; reduces VMT by 4% to 19%.

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## Key Progress Indicators:

1. The percentage of growth resulting in mixed-use development
2. VMT by transportation mode
3. Transportation mode share percentages
4. Gasoline/diesel fuel usage/sales

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# *Increase Transit Accessibility*

## *4-L2*

**Supports CA2020 Goal 4:** **Reduce Travel Demand through Focused Growth**

***GHG Reduction Potential:*** ***1,057 MTCO2e per year***

Encourage all new residential projects consisting of 25 units or more to be located within 0.5 mile of a transit node, shuttle service, or bus route with regularly scheduled, daily service. Consider requirements such as reduced parking, unbundled parking, subsidized public transportation passes, or ride-matching programs, based on site-specific review.

### Community Co-Benefits

### Implementation:

Each jurisdiction will identify potential areas for TOD and prepare policies and incentives to encourage development near high-quality transit service. Strategies include encouraging TOD in updated General Plans, Specific Plans, and zoning codes, and developing new ordinances requiring transit accessibility. Potential incentives could also include reduced parking requirements, reductions in building and permit fees, density increases, and other related items. The communities may also work with the RCPA/Sonoma County Transportation Authority (SCTA) and transit agencies on this measure.

### Measure Commitments:

Reduce communitywide VMT by 0.4% to 5% by encouraging residential development near transit.

### Key Progress Indicators:

1. The percentage of growth resulting in 25+ unit residential development located 0.5 mile from a transit station
2. VMT by transportation mode
3. Transportation mode share percentages
4. Gasoline/diesel fuel usage/sales

# *Supporting Land Use Measures*

**4-L3**

**Supports CA2020 Goal 4:** **Reduce Travel Demand through Focused Growth**

***GHG Reduction Potential:*** ***Not Quantified***

Encourage new development to provide amenities to support transit and other modes of transportation, including transit stops, bicycle facilities, good pedestrian networks, car-sharing locations, and EV charging stations. Support voter-approved urban growth boundaries (UGBs) and community separators. Support conservation of lands outside UGBs.

## Community Co-Benefits

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## Implementation:

Each jurisdiction will identify potential areas for TOD and develop policies and incentives to encourage development near high-quality transit service. Strategies include encouraging TOD in updated General Plans, Specific Plans, and zoning codes, and developing new ordinances requiring transit accessibility. Potential incentives could also include reduced parking requirements, reductions in building and permit fees, density increases, and other related items. The communities may also work with the RCPA/SCTA and transit agencies on this measure. The County is currently preparing a ballot measure to extend voter-approval protections for Community Separators and is considering additional areas for its community separators. The work of the Sonoma County Agricultural Preservation and Open Space District is also essential to the focused growth principles adopted by the County and each city by protecting lands outside UGBs and within community separators.

---

## Measure Commitments:

Encourage new development to provide amenities to support transit and other modes, including transit stops, bicycle facilities, pedestrian networks, car-sharing, and EV charging

---

## Key Progress Indicators:

1. VMT by transportation mode
2. Transportation mode share percentages
3. Gasoline/diesel fuel usage/sales

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# *Affordable Housing Linked to Transit*

**4-L4**

## Supports CA2020 Goal 4: Reduce Travel Demand through Focused Growth

*GHG Reduction Potential: 142 $MTCO_2e$ per year*

Encourage affordable housing developments to locate near transit corridors, transit hubs, and downtown cores.

### Community Co-Benefits

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### Implementation:

Each jurisdiction would develop policies and incentives to encourage affordable housing development for cities and urbanized unincorporated county areas. The jurisdictions would draft new ordinances or offer incentives encouraging the affordable housing development near transit hubs and city centers. Potential incentives could include reduced parking requirements, reductions in building and permit fees, increased density, and other related items. The communities may also work with RCPA/SCTA on this measure.

---

### Measure Commitments:

Establish a goal for the percentage of housing developments greater than 5 units to be affordable and located near transit, between 15% and 23%; reduces VMT by 0.1% to 0.6%.

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### Key Progress Indicators:

1. The percentage of units that will be affordable housing units
2. VMT by transportation mode
3. Transportation mode share percentages
4. Gasoline/diesel fuel usage/sales

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# *Local Transportation Demand Management Program*

## *5-L1*

**Supports CA2020 Goal 5:** **Encourage a Shift toward Low-Carbon Transportation Options**

***GHG Reduction Potential:*** ***2,975 MTCO$_2$e per year***

This measure includes a mandatory trip reduction ordinance (TRO) for employers with 50 employees or more. The mandatory TRO will also provide a non-trip reduction alternative in the form of purchase of an equivalent amount of GHG offsets for employers who decide not to implement trip reductions. This measure also supports voluntary transportation demand management (TDM) measures for employers with fewer than 50 employees, additional voluntary TDM measures (beyond the minimum TRO requirements) for larger employers, and requirements for TDM measures in new large residential projects.

### Community Co-Benefits

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### Implementation:

Each jurisdiction will define the threshold for application of the ordinance, the specific TDM measures to be implemented, and methods for monitoring employer compliance. The jurisdictions may require certain TDM strategies (beyond the minimum TRO requirements) through the permitting process for businesses with 50 or more employees. Incentives for voluntary TDM by employers with fewer than 50 employees may also be used, such as reduced parking requirements, reductions in fees, and other related items. The communities may also work with RCPA/SCTA. For mandatory aspects of the ordinance, a non-trip reduction alternative will be provided in the form of requirements to purchase an equivalent amount of GHG offsets.

---

### Measure Commitments:

Support voluntary TDM measures for small employers (< 50); implement mandatory TRO for employers with 50 employees or more (would reduce communitywide VMT by 2%).

---

### Key Progress Indicators:

1. Number of businesses or employees participating in the TDM program
2. VMT by transportation mode
3. Transportation mode share percentages
4. Gasoline/diesel fuel usage/sales (and GHG offsets for those selecting this option)

# *Carpool-Incentives and Ride-Sharing Program*

**5-L2**

**Supports CA2020 Goal 5:** **Encourage a Shift toward Low-Carbon Transportation Options**

***GHG Reduction Potential:*** ***5,709 MTCO$_2$e per year***

Create or promote a regional ride-sharing program and encourage participation by local employers through their TDM programs. Focus on large employers to create programs. Actively disseminate information to the community regarding the variety of ridesharing options from 511.org to private companies.

## Community Co-Benefits

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## Implementation:

Each participating jurisdiction will develop a carpool incentive program attractive to employers, including managing the financial incentives for carpooling. For example, the City of Santa Rosa offers free parking in downtown garages and eligibility for monthly prize drawings to carpool commuters (and employers) registered in the City's Trip Reduction program. Similar incentives could be provided by other communities. Additional strategies include connecting commuters to formal carpool organizers. Jurisdictions can consider using 511 ridesharing forums, dynamic rideshare apps (e.g., Carma, Zimride, Ridejoy), or helping to facilitate communication among employers in the same geographic area. Communities can also designate convenient locations as casual carpool pickup spots/park-and-ride lots. Other possible strategies include making the requirements for ridesharing services less restrictive to reduce the barrier to entry, such as lowering age limits or eliminating affiliation requirements. Connecting vanpool organizers with commuters would also be beneficial.

---

## Measure Commitments:

Develop a carpool incentive program with employee participation between 25% and 80%; reduce VMT by 1.3% to 3.9%.

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## Key Progress Indicators:

1. Number of businesses or employees participating in the program
2. VMT by transportation mode
3. Transportation mode share percentages
4. Gasoline/diesel fuel usage/sales

# *Guaranteed Ride Home*

*5-L3*

## Supports CA2020 Goal 5: Encourage a Shift toward Low-Carbon Transportation Options

## *GHG Reduction Potential: Not Quantified*

Implement a guaranteed ride home program to provide a free car-share, shuttle, or taxi ride home in case of an emergency (illness, family crisis, unscheduled overtime) for employees who use an alternative to driving alone to work (public transit, carpooling, vanpooling, biking, or walking) on the day of the emergency. For example, the City of Santa Rosa has a guaranteed ride home program for employees (or employers) registered in the City's Trip Reduction Program.

### Community Co-Benefits

### Implementation:

Each jurisdiction would be responsible for implementing this measure. The jurisdictions may work with RCPA/SCTA to implement this program.

### Measure Commitments:

Percentage participation in guaranteed ride home program.

### Key Progress Indicators:

1. Number of businesses or employees participating in the guaranteed ride home program
2. VMT by transportation mode
3. Transportation mode share percentages
4. Gasoline/diesel fuel usage/sales

# *Supporting Bicycle/Pedestrian Measures*

***5-L4***

**Supports CA2020 Goal 5:** **Encourage a Shift Toward Low-Carbon Transportation Options**

***GHG Reduction Potential:*** ***Not Quantified***

This measure includes several local actions to support bicycle use and pedestrian travel.

- Identify bicycle/pedestrian route gaps including improving connections across community boundaries. Prioritize funding and construction of routes that close key gaps across community boundaries.
- Encourage implementation of city and County bike/pedestrian master plans. Identify common barriers to implementation of current plans.
- Update municipal codes to require pedestrian and bicycle facilities (if needed).
- Work with transit agencies to increase bike storage on buses, at bus stops, and at transit hubs and ferry terminals.
- Require bicycle facilities at all park-and-ride lots and transit stations.
- Consider implementing bike-sharing programs.

## Community Co-Benefits

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## Implementation:

SCTA will work with the cities and county transit agencies to coordinate the identification and implementation of cross-jurisdictional bicycle and pedestrian corridor projects. Each jurisdiction will update municipal codes and prepare or update their bike/pedestrian master plans, as needed. As discussed above, the jurisdictions will need to identify route gaps and coordinate with the County and SCTA on routes that are cross-jurisdictional. The bike and pedestrian master plans will outline needed improvements and the areas identified for expansion. Communities will also coordinate with transit agencies to improve the bike-transit facilities.

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## Measure Commitments:

Percentage participation in program.

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## Key Progress Indicators:

1. Number of businesses or employees participating in the program
2. VMT by transportation mode
3. Transportation mode share percentages
4. Gasoline/diesel fuel usage/sales

## *Traffic Calming*

***5-L5***

### Supports CA2020 Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options

### *GHG Reduction Potential: 1,205 $MTCO_2e$ per year*

Implement traffic-calming measures in downtown cores, accident hotspot locations, near schools and libraries, etc. Project design will include pedestrian/bicycle safety and other traffic-calming measures that exceed current jurisdiction requirements. Traffic-calming measures reduce motor vehicle speeds and encourage pedestrian and bicycle trips. Specific measures may include: marked crosswalks, countdown signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, and others.

### Community Co-Benefits

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### Implementation:

Each jurisdiction will develop a strategy to implement this measure appropriate to its community setting. Implementation may include holding public meetings to identify areas of concern for the community, conducting traffic studies to determine where traffic calming is needed, and securing funding to construct traffic-calming features. Traffic-calming measures can be made a condition of new development approvals where appropriate and can be incorporated in General Plans and Specific Plans. Jurisdictions will select specific measures to implement based on the issues and characteristics of each area. The communities may also work with SCTA.

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### Measure Commitments:

Implement traffic-calming measures in downtown core and near schools, yields communitywide VMT reduction of 0.1%.

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### Key Progress Indicators:

1. Percentage implementation of traffic-calming measures
2. VMT by transportation mode
3. Transportation mode share percentages
4. Gasoline/diesel fuel usage/sales

# *Parking Policies*

**5-L6**

**Supports CA2020 Goal 5:** **Encourage a Shift Toward Low-Carbon Transportation Options**

***GHG Reduction Potential:*** ***2,489 MTCO$_2$e per year***

Implement additional parking policies to promote reduction in single-occupancy vehicle travel, such as on-street market pricing in downtown core areas. Consider reduced parking requirements, shared parking, and in-lieu fees, in combination with providing transit and bicycle facilities, in appropriate areas.

## Community Co-Benefits

## Implementation:

Each jurisdiction would be responsible for implementing this measure. The communities may also work with SCTA. Staff would select parking pricing policies appropriate for their community and develop a process for implementation and management, which may include updating municipal codes. The jurisdictions would draft new ordinances and/or General Plan policies, or offer incentives encouraging reduced parking requirements and increased transit or bicycle facilities. Potential incentives could include tax breaks or deductions, or other rebates.

## Measure Commitments:

Percentage increase in parking prices and the percentage of area subject to pricing.

## Key Progress Indicators:

1. Percentage increase in parking pricing
2. Percentage of applicable area subject to parking pricing
3. VMT by transportation mode
4. Transportation mode share percentages
5. Gasoline/diesel fuel usage/sales

# *Supporting Parking Policy Measures*

## *5-L7*

**Supports CA2020 Goal: 5** **Encourage a Shift Toward Low-Carbon Transportation Options**

***GHG Reduction Potential:*** ***Not Quantified***

Offer prioritized parking for hybrid/EV cars, carpools, vanpools at city-center corridors, new developments, public parking areas, and municipal facilities. Consider amending zoning code to require new parking lots to provide prioritized parking for carpools, vanpools, hybrids, and EVs, and provide charging facilities.

### Community Co-Benefits

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### Implementation:

The jurisdictions will identify supporting parking policy strategies appropriate for their community and develop specific policies and guidelines to implement and monitor them. Implementation could include new ordinances and/or General Plan policies, zoning code amendments, or incentives encouraging prioritized parking requirements for alternatively fueled vehicles or carpools. Potential incentives could include tax breaks or deductions, or other rebates. The jurisdictions may also work with RCPA/SCTA.

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### Measure Commitments:

Provide priority parking for low emission vehicles, carpools, vanpools.

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### Key Progress Indicators:

1. VMT by transportation mode
2. Transportation mode share percentages
3. Gasoline/diesel fuel usage/sales

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# *Electric Vehicle Charging Station Program*

## *7-L1*

**Supports CA2020 Goal 7:** **Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment**

***GHG Reduction Potential:*** *60 MTCO$_2$e per year*

Develop local charging stations to support EVs. This measure is in addition to the regional Measure 7-R1.

### Community Co-Benefits

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### Implementation:

The jurisdictions would work with PG&E and SCP to identify grants and other funding sources to help finance the installation of charging stations throughout the county. In addition, SCP, ESD (through available PACE financing options) and Northern Sonoma County Air Pollution Control District (NSCAPCD) would create a package to install and finance charging stations.

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### Measure Commitments:

Install 100 Level I and II charging stations.

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### Key Progress Indicators:

1. The number of EVs registered
2. The number of EV charging stations installed
3. The amount of electricity distributed/sold by the charging stations
4. The number of Clean Vehicle Rebate Project rebates issued
5. Gasoline/diesel fuel usage/sales

# *Electrify Construction Equipment*

## *7-L2*

**Supports CA2020 Goal 7:** **Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment**

***GHG Reduction Potential:*** ***386 $MTCO_2e$ per year***

Establish a goal for a percentage of construction equipment to use alternative fuels or electricity in place of diesel and gasoline. Equipment could include electric or hybrid-electric dozers, excavators, or loaders, all of which are on the market. Construction equipment powered by other alternative fuels, such as compressed natural gas (CNG), is also available. New development would be required to provide a construction equipment management plan that meets the local community requirements for use of alternatively fueled equipment (including electrical equipment) during project construction.

### Community Co-Benefits

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### Implementation:

Each jurisdiction would work in close cooperation with the appropriate air district to draft an ordinance and develop outreach programs to be consistent with current air district rules and California Environmental Quality Act (CEQA) guidelines. The air district sets air quality related requirements on construction vehicles and also provides mitigation options related to construction vehicles through Voluntary Emission Reduction Agreement programs that may overlap with this measure.

This measure could be implemented through discretionary approvals and permitting for new projects. Communities could provide incentives for electric and more efficient construction equipment to developers and contractors, such as rebates and subsidies and information on financing for this equipment. Encourage the use of alternative fuels for construction equipment on site, where feasible, such as CNG, liquefied natural gas, propane, or biodiesel. Require a certain percentage of all construction equipment on new development projects to be electrically powered as a condition of approval; this could be incorporated into the construction contracts.

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### Measure Commitments:

Electrify 5% to 10% of construction equipment.

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### Key Progress Indicators:

1. Electric equipment purchases
2. Construction equipment fuel use

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# *Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching*

**7-L3**

## Supports CA2020 Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment

*GHG Reduction Potential: 2,392 $MTCO_2e$ per year*

This local measure has two elements: First, it is a voluntary measure to support farmers wanting to convert equipment to fuels with lower GHG intensity. Second, the City of Petaluma has received a grant for a Biomass to Biofuel Project, which is expected to result the quantified reduction.

Farmers can reduce fossil fuel use in agricultural equipment by converting equipment currently using gasoline, diesel, or liquefied petroleum gas to alternative fuels with lower GHG intensity (such as natural gas, biofuels, or solar electricity) as feasible, keeping equipment maintained and in good working order, replacing old equipment with newer and more efficient equipment, and using global positioning systems (GPS) to optimize equipment operation.

The City of Petaluma has received a grant to partner with the California Energy Commission on a project to capture gas released by wastewater solids and food waste generated in the City and reuse it for fuel for the City's municipal fleet (transit and waste collection vehicles).

### Community Co-Benefits

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### Implementation:

Encourage farmers to participate in the California Air Resources Board's (ARB) Carl Moyer Program, which provides incentives for engines that beat emissions standards. A particular focus may be expanding renewable energy use for water pumps and wind machines. The City of Petaluma will implement its biofuels project in accordance with the state grant.

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### Measure Commitments:

Support owners of agricultural and other off-road equipment in switching to cleaner fuels and keeping equipment in good working order; goal of 10% reduction in GHG. The City of Petaluma will implement its biofuels project.

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### Key Progress Indicators:

1. Alternative fuel equipment purchases
2. Equipment fuel use

# Idling Ordinance

8-L1

## Supports CA2020 Goal 8: Reduce Idling

*GHG Reduction Potential: Not quantified*

Limit idling of all commercial vehicles to 3 minutes except as necessary for the loading or unloading of cargo within a period not to exceed 30 minutes.

### Community Co-Benefits

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### Implementation:

Each jurisdiction would adopt and implement a new commercial vehicle idling ordinance. The communities could also work with RCPA and/or Bay Area Air Quality Management District (BAAQMD) and NSCAPCD to implement the ordinance.

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### Measure Commitments:

Limiting idling of commercial vehicles to 3 minutes will save 2% of commercial vehicle fuel.

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### Key Progress Indicators:

1. Adoption of idling limit ordinances
2. Diesel fuel usage/sales

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# *Idling Ordinance for Construction Equipment*

**8-L2**

**Supports CA2020 Goal 8:** **Reduce Idling**

***GHG Reduction Potential:*** ***163 MTCO$_2$e per year***

Adopt an ordinance limiting idling time for heavy-duty construction equipment beyond ARB or local air district regulations and if not already required as part of CEQA mitigation. The California Air Pollution Control Officers Association (2010) recommends a 3-minute idling limit. Encourage contractors as part of permitting requirements or city contracts to submit a construction vehicle management plan that may include idling time requirements, hour meters on equipment, and/or documenting the horsepower, age, and fuel of all on-site equipment. California state law currently requires all off-road equipment fleets to limit idling to no more than 5 minutes.

## Community Co-Benefits

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## Implementation:

Each jurisdiction would adopt and implement a new commercial vehicle idling ordinance. The jurisdictions could also work with RCPA and/or BAAQMD and NSCAPCD to implement the ordinance.

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## Measure Commitments:

Reduce idling time for construction equipment to 3 minutes (beyond state requirement of 5 minutes).

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## Key Progress Indicators:

1. Adoption of idling limit ordinances
2. Diesel fuel usage/sales

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# *Create Construction and Demolition Reuse and Recycling Ordinance*

*9-L1*

## Supports CA2020 Goal 9: Increase Solid Waste Diversion

*GHG Reduction Potential:* *3 MTCO$_2$e per year*

Implement consistent countywide goals for recycling and reuse of construction and demolition (C&D) waste. This could follow the Petaluma model, which requires development projects to have a Construction Phase Recycling Plan that addresses the reuse and recycling of major waste materials, creates a minimum diversion rate for C&D waste on all projects (such as 75%), and requires an inventory of usable materials prior to any demolition.

### Community Co-Benefits

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### Implementation:

Each jurisdiction will implement this measure through a C&D ordinance, with assistance from the Sonoma County Waste Management Agency (SCWMA). SCWMA or the RCPA could assist by drafting a model ordinance for use/adaptation by local jurisdictions.

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### Measure Commitments:

Implement consistent countywide goals for C&D waste to establish goal and procedures. Increase C&D diversion to 72% to 75% by 2020.

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### Key Progress Indicators:

1. C&D waste diversion rate
2. Tonnage of C&D waste sent to landfills
3. Tonnage of C&D waste recycled
4. Tonnage of C&D waste composted
5. Tonnage of C&D waste diverted to other ends

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# *Senate Bill SB X7-7 – Water Conservation Act of 2009*

**11-L1**

## Supports CA2020 Goal 11: Reduce Water Consumption

*GHG Reduction Potential: 16,540 $MTCO_2e$ per year*

Meet (or exceed) the state's per-capita water use reduction goal for 2020 as established by SB X7-7 (2009). This statute requires urban water agencies throughout California to increase conservation to achieve a statewide goal of a 20% reduction in urban per-capita use (compared to nominal 2005 levels) by December 31, 2020 (referred to as the "20X2020 goal"). Each urban water retailer in the county subject to the law has established a 2020 per-capita urban water use target (in terms of gallons per capita per day) to meet this goal. Specific per-capita water use reduction goals vary by water agency.

### Community Co-Benefits

### Implementation:

Each urban water retailer in the county subject to the law has established a 2020 per-capita urban water use target to meet this goal and is responsible for implementing this measure. The jurisdictions would also need to work with the water retailers to implement water-saving measures at the local level. Water cutbacks would require the communities to engage and encourage residents and businesses to find ways to save water. The jurisdictions will use the Energy Watch partnership and work with SCP and PG&E to help implement this measure. The jurisdictions will also encourage "pay as you save" programs for energy and water efficiency.

### Measure Commitments:

Meet or exceed state goal (20% reduction in per capita use).

### Key Progress Indicators:

1. Per-capita water use for each water retailer/community
2. Gallons of water saved
3. Water consumption

# *Water Conservation for New Construction*

## *11-L2*

### Supports CA2020 Goal 11: Reduce Water Consumption

### *GHG Reduction Potential: 252 MTCO$_2$e per year*

Implement a water-reduction target for new development that exceeds the SB X7-7 20% reduction target, such as a 30% reduction in water use for each community. To satisfy this goal, require adoption of the Voluntary CALGreen Tier 1 water-efficiency measures for new residential and nonresidential construction. CALGreen voluntary measures recommend use of water-efficient appliances and plumbing and irrigation systems, as well as more aggressive water savings targets.

### Community Co-Benefits

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### Implementation:

The jurisdictions will update building codes for new buildings to require use of voluntary CALGreen Tier 1 water-efficiency measures, including:

- Use of low-water irrigation systems
- Installation of rainwater systems
- Installation of water-efficient appliances and plumbing fixtures
- A 30% to 40% reduction over baseline indoor water use, and a 55% to 60% reduction in outdoor potable water use (CALGreen Tier 1 or 2).

Communities could apply for State Water Resources Control Board grant money for the water-energy “standard offer” pilot project.

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### Measure Commitments:

Require Voluntary CALGreen Tier 1 water-efficiency measures for 0% to 50% of new residential and 0–100% of new residential and nonresidential construction.

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### Key Progress Indicators:

1. Gallons of water saved
2. Water consumption
3. Energy savings associated with water usage
4. Total energy consumption associated with water usage

## *Water Conservation for Existing Buildings*

## *11-L3*

**Supports CA2020 Goal 11: Reduce Water Consumption**

***GHG Reduction Potential: 2,425 $MTCO_2e$ per year***

Achieve a water-reduction target for existing development that exceeds the SB X7-7 20% reduction target, such as a 30% reduction in water use by implementing a program to retrofit existing buildings to achieve higher levels of water efficiency. Encourage existing buildings (constructed before 2015) to use voluntary CALGreen Tier 1 water-efficiency measures.

### Community Co-Benefits

### Implementation:

The jurisdictions could require water conservation upgrades for all existing buildings that undergo major remodels or renovations and/or incentivize water-efficiency upgrades outside the permitting process. Education and outreach programs will help educate residents and businesses about the importance of water efficiency and how to reduce water use. Rebate programs will help promote installation of water-efficient plumbing fixtures. The program could include:

- A Water Audit Program in collaboration with local water purveyors that offer free water audits
- Development plans to ensure water conservation techniques are used (e.g., rain catchment systems, drought tolerant landscape)
- Requirements for water-efficiency upgrades when permitting renovations or additions of existing buildings
- Use of water conservation pricing (e.g., tiered rate structures) to the extent allowed by law to encourage efficient water use
- Incentives for projects that demonstrate significant water conservation through use of innovative technologies

The jurisdictions will use the Energy Watch partnership and work with SCP and PG&E to help implement this measure. The communities will also encourage “pay as you save” programs for energy and water efficiency.

### Measure Commitments:

Install water-efficiency measures in 0% to 25% of existing residential and 0% to 50% of existing nonresidential.

### Key Progress Indicators:

1. Gallons of water saved
2. Water consumption
3. Energy savings associated with water usage
4. Total energy consumption associated with water usage

## *Greywater Use*

**12-L1**

### Supports CA2020 Goal 12: Increase Recycled Water and Greywater Use

***GHG Reduction Potential:* *26 MTCO$_2$e per year***

Establish a goal to replace a certain percentage of potable water used for residential non-potable uses (landscaping, toilet flushing, etc.) with greywater.

### Community Co-Benefits

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### Implementation:

Each participating jurisdiction will establish a greywater goal for this measure and will work with water providers to assess progress toward the goals.

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### Measure Commitments:

Replace 1% to 50% of potable water currently used for non-potable uses with greywater.

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### Key Progress Indicators:

1. Percentage of greywater water used for residential non-potable water uses
2. Gallons of greywater used
3. Gallons of potable water saved
4. Total potable water consumption

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# *Green Energy for Water Production and Wastewater Processing in Healdsburg and Cloverdale*

## *14-L1*

**Supports CA2020 Goal 14:** **Increase Use of Renewable Energy in Water and Wastewater Systems**

*GHG Reduction Potential:* *412 MTCO$_2$e per year*

Healdsburg would use green energy (100% renewable) sources for a certain percentage of its water production and/or conveyance. Cloverdale has implemented solar energy arrays at the city water and wastewater plants.

### Community Co-Benefits

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### Implementation:

Healdsburg will be responsible for implementing green energy projects at its water production and wastewater processing facilities. Cloverdale has already implemented solar arrays at its water and wastewater plants and will be responsible for continuing to ensure that the arrays are used to their maximum potential

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### Measure Commitments:

Provide increasing amount of renewable energy for water supply and wastewater treatment in the two cities.

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### Key Progress Indicators:

1. Solar electric generation capacity
2. Electricity generation
3. Renewable portfolio for Healdsburg's electricity
4. Healdsburg electricity emission factor

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## *Livestock Manure Management*

***15-L1***

**Supports CA2020 Goal 15: Reduce Emissions from Livestock Operations**

***GHG Reduction Potential: Not quantified***

This voluntary measure would encourage manure management techniques that reduce emissions from the decomposition of manure at dairies. Strategies include on-site management approaches that reduce methane emissions, like dry composting or pasturing, as well as opportunities to convert methane to fuel using some form of methane digestion.

### Community Co-Benefits

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### Implementation:

Under this measure, the County would work with local partners, like the Resource Conservation Districts, and with dairies to discuss relevant incentives and the feasibility of alternative manure management strategies, including installing methane capture equipment.

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### Measure Commitments:

Pursue manure management practices that reduce or capture methane that would otherwise be released to the atmosphere.

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### Key Progress Indicators:

1. Percentage of dairies (and dairy cows) using a low-methane manure management practice
2. Number and capacity of methane digester(s) installed

## *Reduce Emissions from Enteric Fermentation*

## *15-L2*

### Supports CA2020 Goal 15: Reduce Emissions from Livestock Operations

### *GHG Reduction Potential: Not Quantified*

This voluntary measure would encourage dairies and livestock operations to explore ways to reduce GHG emissions from enteric fermentation (methane and nitrous oxide). One method for reducing these emissions would be changing animal diets to inhibit GHG production. Options include dietary oils (such as whole cottonseed oil, sunflower oil, coconut oil, and palm oil), the use of corn or legume silage in place of grass silage, use of concentrate feeds, nitrates, ionophores, and tannins, and improvement of forage quality and the overall efficiency of dietary nutrient use. Potential use of pomace from winemaking should also be explored. The primary challenge is the limited availability of alternative feed materials that both reduce enteric fermentation and allow dairies to maintain their organic certification; 80% to 90% of Sonoma County dairies are organic.

### Community Co-Benefits

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### Implementation:

Under this measure, the County would work with dairy and livestock operators to test feasible and cost-effective approaches suitable for application at organic dairies in Sonoma County. The County would help to identify grant sources to fund demonstration projects with voluntary dairy/livestock operator participation.

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### Measure Commitments:

Pursue best practices for animal diets to minimize enteric fermentation.

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### Key Progress Indicators:

1. Animal diet best practices

# *Optimize Fertilizer Use*

**16-L1**

## Supports CA2020 Goal 16: Reduce Emissions from Fertilizer Use

## *GHG Reduction Potential: 1,759 MTCO$_2$e per year*

Encourage voluntary agricultural practices that reduce or eliminate the need for fertilizer (especially synthetic fertilizer). Work with growers to provide incentives for organic fertilizers as an alternative. Create an outreach program to help growers optimize nitrogen application rates, decrease overall fertilizer inputs and cost, maintain current crop yields, and reduce emissions of nitrous oxide.

### Community Co-Benefits

### Implementation:

The County would lead this measure, given that the vast majority of agricultural activity is in the unincorporated area. Cities with agricultural activities (including urban farming and community gardens) could collaborate with the County to implement this measure. The County would develop voluntary policies that encourage alternatives to synthetic fertilizers. The County would need to work with growers to discuss which incentives would be relevant and the levels of reduction that would be feasible.

### Measure Commitments:

Develop incentives and tools to reduce fossil fuel–based fertilizer use by 20%.

### Key Progress Indicators:

1. The amount and type of fossil fuel–based fertilizer applied to crops

# 4. Implementation

# Chapter 4
# Implementation

## 4.1 Introduction

Development of this plan by the Regional Climate Protection Authority (RCPA) and its member governments is another step in Sonoma County's ongoing local climate leadership. Coordinated efforts to translate this leadership into action are essential to realize the greenhouse gas (GHG) reductions and community co-benefits identified in Chapter 3.

This chapter describes five core elements of plan implementation:

1. Coordinating implementation across many entities
2. Securing funding and facilitating financing for plan implementation
3. Engaging the community and encouraging broad participation
4. Monitoring and reporting on progress
5. Adaptively managing plan implementation and updates

In this discussion of implementation it is important to acknowledge the regional, multi-jurisdictional nature of Climate Action 2020 (CA2020). While RCPA has led the development of CA2020 and will remain in that leadership role through implementation, specific details about implementation of the local GHG reduction measures will be determined by the city (and town) councils and the County Board of Supervisors. City- and county-level implementation will need to reflect local conditions and priorities and additional input from the local community. Therefore, the local measures in CA2020 may be implemented in different ways in different jurisdictions. The cities and the County are committed to the local GHG reduction measures they have identified in CA2020, including a commitment to develop the necessary implementation details to achieve key progress indicators, with support from RCPA and others.

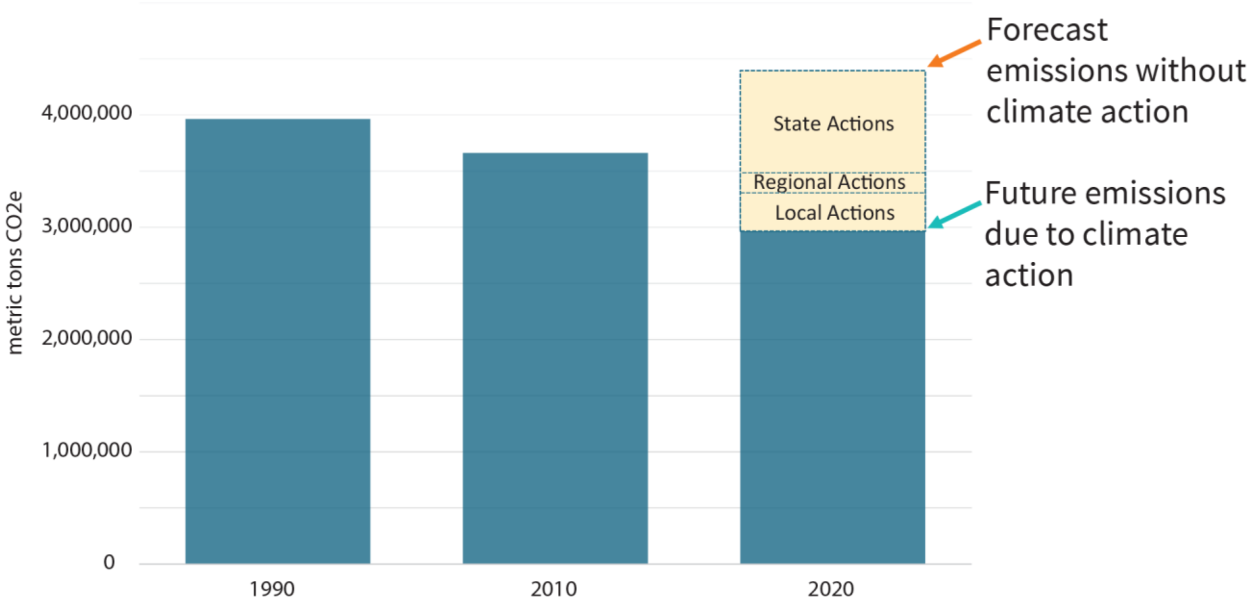
As noted elsewhere in CA2020, the City of Santa Rosa adopted its community CAP in 2012. The City will continue to implement the measures in its plan and those measures will contribute to regional (countywide) GHG reductions.

## 4.2 Coordinated Implementation

If ever an issue called for coordinated, multi-partner effort, it is climate change; progress depends on communities working together. CA2020 reflects an innovative, collaborative approach to responding to climate change across multiple local communities. By working together, Sonoma County's jurisdictions can achieve greater GHG reductions, and do it more efficiently than if each jurisdiction acted on its own.

CA2020 includes a regional (countywide) goal that will be achieved through the combined impact of local, regional, and state measures implemented in a coordinated manner as a comprehensive GHG emissions-reduction program. With the local commitments identified in this CAP for implementation by 2020, Sonoma County will achieve its regional target of 25% below 1990 levels and be well on the way toward the RCPA's long-term goals of 40% below 1990 levels by 2030 and 80% below by 2050 (Figure 4-1).

**Figure 4-1. Countywide 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions**



CA2020 commits local governments to implementing a suite of measures appropriate for each community based on their prior efforts, development and economic trends, and community priorities. In Chapter 3, 39 GHG reduction measures are identified that are unique to local government authorities and from which RCPA member jurisdictions have selected. Specific commitments are outlined by jurisdiction in Chapter 5.

Success in achieving CA2020 goals will also rely on GHG reduction measures implemented by state and regional entities that can provide services and resources on behalf of *all* communities more efficiently than individual jurisdictions on their own. These state and regional measures, most of which are already in place or underway, are a critical part of CA2020 and provide a foundation from which local measures can build. State and regional measures are also outlined in Chapter 3.

### 4.2.1 The Role of RCPA

RCPA is a local government agency created in 2009 to coordinate a regional response to climate change. It is overseen by a Board of elected officials from each of the nine cities and the county, the same Board that oversees the Sonoma County Transportation Authority (SCTA). RCPA builds from SCTA capacity to support, expand, and replicate successful programs already underway at member jurisdictions and partner agencies, and to fill gaps in local climate response. The regional structure provided by RCPA helps ensure that all jurisdictions participate in achieving the countywide GHG reduction goals.

RCPA led development of this plan and is committed to its implementation by securing funding, managing pilots and programs, developing research and best practices, and supporting members and regional partners in coordinated implementation. Principles that drive collaboration are embedded in RCPA’s approach.

- **Consistency**: Policies and programs developed and deployed through regional collaboration minimize gaps in service so all residents benefit from climate action. Inter-jurisdiction consistency also creates more transparency for residents and businesses in the county.
- **Efficiency**: By pooling resources the jurisdictions of Sonoma County are able to aggregate and align human and financial resources, across partners large and small.
- **Integration**: Collaborative structures bring individual agency or community efforts together for a common purpose, aligning related projects toward common goals.
- **Multi-benefit impact**: When agencies work toward a shared vision, both common and distinct goals are served; success is more likely with more invested partners.

The RCPA Board provides a venue for local governments in Sonoma County to participate in establishing priorities, and to direct RCPA staff in the implementation of pilots and programs. The Board oversees climate action programs that serve the entire county, including those offered by the Bay Area Regional Energy Network, long range planning including CA2020, the Shift Sonoma County transportation plan, the Climate Ready North Bay vulnerability assessment, and community engagement related to climate change, such as the Sonoma County Climate Adaptation Forums.

To carry out the priorities of the Board, RCPA staff work with staff from member agencies to develop and manage programs to the benefit of the entire county. Staff collaboration includes a Staff Working Group (SWG) used to develop CA2020. The SWG will continue to provide ongoing coordination of CA2020 implementation. RCPA staff also support individual jurisdictions and agency partners to integrate the implementation of specific programs into a cohesive strategy.

As the lead agency, RCPA will adopt CA2020 first (including certification of the Environmental Impact Report). In addition to the 2020 GHG emissions reduction goal, the RCPA will also adopt longer-term reduction goals for 2030 and 2050. Following adoption by RCPA, each city and the County will adopt its portion of CA2020 (see Chapter 5) in a form appropriate to that jurisdiction. Once adopted, the cities,

In 2014, RCPA was identified by the White House as one of 16 local government Climate Action Champions from around the United States, in recognition of the successes achieved via the collaborative model in place in Sonoma County.

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county, and regional agencies will implement the measures each has committed to in their respective CA2020 adoption processes.

RCPA will coordinate and facilitate implementation actions by aggregating funding opportunities to leverage federal, state, and regional grants; providing technical assistance to local partners; developing shared tools (such as case studies, model policy language, and new development consistency checklists); promoting inter-jurisdiction efficiencies through communication and collaboration; and promoting accountability for CAP implementation through measurement and reporting.

RCPA will also directly implement certain measures on behalf of its members as it has since its inception. Examples include Windsor Efficiency Pay As You Save, Energy Upgrade California, Climate Ready North Bay, and Shift Sonoma County.

### 4.2.2 The Role of RCPA Members

While the coordinating role of RCPA is critical, the ambitious countywide GHG reduction target cannot be achieved without strong leadership and commitment to action from RCPA member jurisdictions. RCPA can help ensure that the actions of individual jurisdictions are greater than the sum of its parts, but local action is essential.

As a part of the implementation process, each jurisdiction will participate in the CA2020 SWG and may also identify additional staff as needed to bring specific expertise to the CA2020 implementation effort. Each jurisdiction’s SWG representative will be responsible for participating in RCPA efforts to support implementation, and for organizing, monitoring, and reporting on implementation in their community. RCPA will provide as many resources as possible on behalf of SWG members in order to maximize efficiency.

SWG members will also coordinate and lead the implementation of measures specific to their communities, as well as local actions to support regional GHG reduction measures, including Advanced Climate Initiatives, with the support from RCPA and one another. Local governments will also use CA2020 as a tool to communicate and solidify their priorities within their communities.

RCPA member jurisdictions will continue to pool resources essential to the success of RCPA, staff participation in coordination meetings and processes (such as data collection and status reporting), collaboration on grant applications, and active participation in other aspects of plan implementation. Given the breadth of measures, success will require engagement from key departments that oversee different GHG reduction strategies such as planning, engineering, public works, fleet management, facilities management, police, fire and emergency services, and parks and recreation.

The regional approach to CA2020 recognizes that the cost of implementation would be higher if each jurisdiction developed and implemented measures on their own. RCPA staff contributions can help ensure that city- or county-specific investments can be most efficient and effective, and leveraged across multiple local governments.

As noted elsewhere, the City of Santa Rosa adopted its own CAP in 2012. The City will continue to implement the measures in its plan and may coordinate and collaborate with RCPA and other cities throughout the implementation process.

### 4.2.3 The Role of Regional Entities

RCPA is not the only local agency that provides services and support to communities in reducing GHG emissions and preparing for climate change. CA2020 also includes GHG reduction measures that will be implemented by agencies under local governance that provide services and resources on behalf of *all* (or multiple) jurisdictions more efficiently than the individual communities can on their own, especially the smaller cities.

These regional measures are a critical part of CA2020 (as outlined in Chapter 3). Other local public agencies are also already working regionally to advance local climate action goals in support of CA2020, including the following.

- **Northern Sonoma County Air Pollution Control District (NSCAPCD)** is the regional agency responsible for developing and implementing air quality plans for the northern part of Sonoma County. NSCAPCD also sponsors various air quality programs that can support implementation of several energy-efficiency, transportation, and renewable energy strategies.
- **Sonoma Clean Power (SCP)** is the community choice aggregator in Sonoma County and will be the lead for expanding participation rates over time and increasing the renewable portfolio for electricity generated to serve the county. SCP may also offer incentives and rebate programs to encourage energy efficiency, distributed and community-scale renewable energy, and use of electric vehicles.
- **Sonoma County Agricultural Preservation and Open Space District** permanently protects the diverse agricultural, natural resource, and scenic open space lands of Sonoma County for future generations. Conserving and improving the management of natural and working landscapes reduces net GHG emissions and delivers multiple other benefits. A healthy forest, for instance, sequesters carbon while also storing and filtering water, providing habitat for wildlife, and building resilience to climate change.
- **Sonoma County Energy Independence Office:** The County's Energy and Sustainability Division was created in 2006 to promote and deliver solutions necessary to mitigate environmental impacts and prepare for climate change. As the community-facing office of the Energy and Sustainability Division of the County of Sonoma, the Energy Independence Office serves as a community clearinghouse of information, tools, services, programs, and resources for the general public, contractors, and other public entities engaged in pursuing energy efficiency, water conservation, and renewable energy. It also manages the PACE programs throughout the County. Although the office is part of the County of Sonoma, it provides services countywide and is therefore listed among the regional agencies.
- **Sonoma County Waste Management Agency (SCWMA):** Sonoma County jurisdictions (except Petaluma) contract all solid waste collection and recycling services through SCWMA.

The jurisdictions will work with the agency to increase waste reduction, recycling, and composting, consistent with the solid waste measures in CA2020. The cities/County and SCWMA may also be able to share facilities, programs, and incentives to help ensure that waste diversion goals are achieved by 2020.

- **Sonoma County Transportation Authority (SCTA):** To implement the local transportation strategies fully, collaboration with regional transportation agencies is necessary. It is essential that the cities, the County, SCTA, and the various transit agencies establish a shared vision for how transportation and land use planning can support sustainable growth. SCTA's Comprehensive Transportation Plan is the primary platform for coordinated, countywide planning for transportation measures.
- **Sonoma County Water Agency (SCWA)** is the primary water wholesaler in the county. SCWA has been implementing numerous measures to reduce the carbon footprint of providing water and integrating renewable energy into its system. SCWA also operates several water conservation and educational programs. The jurisdictions can work with SCWA to promote water conservation in the future.

Essentially, there are already many partners with tools in place and underway to achieve GHG reductions. This plan leverages those tools and encourages their use at larger scales.

### 4.2.4 The Role of the Community

As described in Chapter 1, CA2020 was developed with extensive community input and builds on earlier community-based efforts to address climate change, such as the Community Climate Action Plan developed by the Center for Climate Protection (formerly the Climate Protection Campaign). Continued community involvement is no less important for implementation of CA2020, particularly given that many strategies depend on voluntary commitment, creativity, and participation. Efforts like the Community Resilience Challenge led by Daily Acts demonstrate the power of collective action to advance the goals of CA2020.

**Community Resilience Challenge**

The Community Resilience Challenge is an annual campaign that inspires citizens, leaders and groups to take action to save water, grow food, conserve energy, reduce waste and build community. From 2010 2016, more than 5,000 people registered over 28,000 resilience building actions in Sonoma County. Nearly double this number of actions and projects have been registered through regional and national partners. The campaign encourages individuals, schools, organizations, municipalities and businesses to take practical actions to create more resilient homes, schools, workplaces and communities. The Challenge inspires action, collaboration and civic engagement, strengthening both relationships and networks for lasting change.

In addition to the individual actions that Sonoma County residents and businesses can take to reduce their own carbon footprint (see Chapter 1, Section 1.3.3), community members will also participate in the public process at individual cities and the County to help shape the details of local measure implementation. Support from the community will be essential to this local decision-making process if Sonoma County is going to achieve its ambitious GHG reduction target. Local non-governmental organizations will likewise play a key role in this process, not only supporting the local implementation actions, but also providing key expertise to inform CA2020 implementation and ongoing adaptive management.

The community—including residents, businesses, and non-governmental organizations—will also play an important role in holding local governmental entities accountable for successful plan implementation. RCPA and local government partners are committed to transparent reporting and implementation and to collaborating with local businesses, community groups, residents, developers, and property owners to establish partnerships and encourage active involvement in CA2020. However, as with most governmental initiatives, that commitment will only be successful if the community reciprocates with active engagement and participation in CA2020 implementation.

### 4.2.5 Implementation Strategy

RCPA will coordinate with the SWG to accomplish the following general implementation steps:

- **Develop Implementation Plans for Each Emissions-reduction Measure**. RCPA will develop implementation plans that will include milestones, deadlines, funding opportunities, partners, programs, and other details, as necessary, to support implementation.
- **Estimate Project-Specific Costs**. The estimated costs/savings for certain emissions-reduction strategies are provided in Appendix C, *Reduction Measure Methods*. Wherever possible, RCPA will develop more detailed project-specific costs and savings estimates to provide a more accurate assessment of up-front costs and potential returns to communities.
- **Review New Development for Consistency with the Plan**. As described in Chapter 1, meeting the countywide GHG reduction target for 2020 requires new development to be consistent with climate goals by implementing measures that will minimize new GHG emissions. To accomplish this, RCPA member agencies will use the checklist in Appendix A to determine future project consistency with the applicable measures CA2020.
- **Draft Ordinances and/or Codes**. RCPA will support efforts of member agencies to amend their municipal codes where needed to implement certain emissions-reduction measures. Implementation tools may include examples from existing models in other communities, draft policy or model code language, and working with member agency staff to address questions and opportunities for consistency.

- **Establish Partnerships**. Some of the emissions-reduction measures will require new program partnerships that will be internal to each jurisdiction, among the participating communities, and with external agencies.
- **Pursue Funding Sources and Facilitate Investment in Solutions at Scale**. RCPA will lead and support the pursuit of funding from state and federal agencies to support the implementation of emissions-reduction measures. RCPA will also pursue strategies to expand private investment in climate solutions. RCPA member jurisdictions will continue to participate in RCPA-led grant efforts, but will also consider internal funding sources such as facility master plan programs, enterprise budgets, and capital improvement programs.
- **Create Monitoring/Tracking Processes and Indicators**. RCPA will lead emissions tracking and monitoring of program progress, particularly to identify and remedy shortfalls or ineffective programs.
- **Engage the Community and Stakeholders**. RCPA and partners will engage and educate the public and stakeholder groups regarding the implementation of emissions-reduction measures.
- **Lobby for State and Federal Action.** RCPA and partners will identify and lobby for state and federal actions that will help Sonoma County reach its emissions reduction and adaptation goals. State and federal actions that could help fund local climate change programs include cap and trade and carbon pricing.

The specific steps for implementing CA2020 measures will vary, but an illustration of how the RCPA will support member jurisdictions is provided in Table 4.2-1.

**Table 4.2-1. Sample process for RCPA supported implementation of local measures**

| **Implementation Process:**<br>**Measure 2-L1 Solar in New Residential Development** | **Responsible Party** |
|---|---|
| Research current status of solar energy requirements in jurisdictions | RCPA |
| Assemble examples of solar installation requirements for new residential buildings are identified and researched | RCPA |
| Convene ad hoc solar and building industry meeting to discuss current and potential future practice | RCPA |
| Develop draft measure tool materials (background information, cost estimates, case studies, resources, best practices, FAQs, incentives & rebates) and model policy language | RCPA |
| Present draft measure tool materials and model policy language to Staff Working Group (SWG) | RCPA |
| Review and comment on draft measure tool materials and model policy language | SWG |
| Refine measure tool materials and model policy language based on feedback and further research as needed | RCPA |
| Assemble and deliver customized final measure tool materials, including a draft model policy and supporting analysis to be used in jurisdiction staff reports to propose measure implementation | RCPA |
| Provide direction on jurisdiction specific requirements | Individual Jurisdictions |
| Refine model policy to reflect jurisdiction specific needs and opportunities | SWG |
| Adopt requirements for solar energy installation | Individual Jurisdictions |

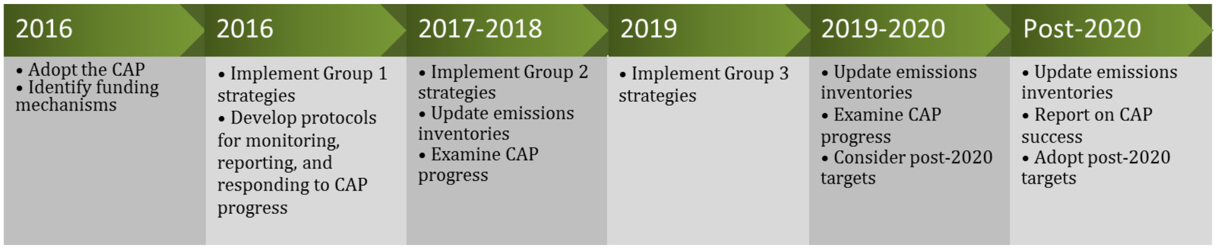
### 4.2.6 Implementation Schedule

Implementation of the emissions-reduction strategies will occur following adoption of CA2020 to ensure that all measures are in place as planned by 2020. RCPA and member agencies will initially pursue strategies based on the grouping outlined below and summarized in Figure 4-2.

- Group 1 strategies are those that need to be developed early and/or require long lead times to achieve reduction targets by 2020.
- Group 2 strategies are those that do not need to be online immediately but need time for development to meet 2020 reduction targets.
- Group 3 strategies are those that need only to be online by 2020 and can be started later in the decade.

These groupings were proposed based on expected GHG reductions, cost and availability of funding, co-benefits, consistency with existing programs, implementation effort, and the timing necessary to support meeting the 2020 target. However, measures may be implemented in a different order depending on funding or policy opportunities.

**Figure 4-2. Implementation Timeline for the GHG Reduction Measures**



| 2016 | 2016 | 2017-2018 | 2019 | 2019-2020 | Post-2020 |
|---|---|---|---|---|---|
| • Adopt the CAP<br>• Identify funding mechanisms | • Implement Group 1 strategies<br>• Develop protocols for monitoring, reporting, and responding to CAP progress | • Implement Group 2 strategies<br>• Update emissions inventories<br>• Examine CAP progress | • Implement Group 3 strategies | • Update emissions inventories<br>• Examine CAP progress<br>• Consider post-2020 targets | • Update emissions inventories<br>• Report on CAP success<br>• Adopt post-2020 targets |

Implementation of the individual emissions-reduction strategies will be led by the specific city/County divisions shown in Table 4.2-2, with support from RCPA and other local agency staff as appropriate. Other regional entities (e.g., SCP) will be responsible for implementing regional measures and may also support local measures. The primary entities responsible for implementation of each measure are also shown in Table 4.2-2.

**Table 4.2-2. Implementation Timeline for the GHG Reduction Measures**

| Measure | Responsible Entities |
|---|---|
| **Group 1 – Continuation or start of implementation, 2016** | |
| **Regional Measures** | |
| 1-R1. Community Energy Efficiency Retrofits for Existing Buildings | Sonoma County Energy Independence Program, RCPA, Sonoma Clean Power (SCP) |
| 1-R2. Expand Community Energy Efficiency Retrofits Program | Sonoma County Energy Independence Program, RCPA, SCP |
| 2-R1. Community Choice Aggregation | SCP |
| 5-R1. Improve and Increase Transit Service | Sonoma County Transportation Authority, Golden Gate Transit, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus |
| 5-R2. Supporting Transit Measures | SCTA, Golden Gate Transit, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus |
| 5-R3. Sonoma-Marin Area Rail Transit (SMART) | SMART and local jurisdictions with SMART stations |
| 9-R1. Waste Diversion Goal | Sonoma County Waste Management Authority with cooperation from RCPA and local jurisdictions |
| 14-R1. Sonoma County Water Agency Carbon-Free Water by 2015 | Sonoma County Water Agency, supported by local jurisdictions |

| Measure | Responsible Entities |
|---|---|
| 17-R1. Conserve Open Space and Working Lands | Sonoma County Agricultural Preservation and Open Space District working with other agencies (including cities and the County) and non-governmental partners |
| 17-R2. Enhance Natural Resources on Open and Working Lands through Climate Beneficial Management Practices | Resource Conservation Districts (RCDs) and partners |
| 18-R1. Sustainable Agriculture Certification Programs | Winemakers/winegrowers, the County |
| 18-R2. Promote the Sale of Local, Sustainable, and Organically Grown Foods and/or Products | Farmers, ranchers, cities/County |
| 19-R1. Carbon Farming | The County, RCDs, Natural Resources Conservation Service (NRCS), Sonoma County Agricultural Preservation and Open Space District |
| 19-R2. Establish a Target for Increased Carbon Sequestration | RCPA, the County, RCDs, NRCS, Sonoma County Agricultural Preservation and Open Space District, and partners |
| **Local Measures** | |
| 1-L1. Expand the Green Building Ordinance Energy Code | Windsor |
| 1-L2. Outdoor Lighting | Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 1-L3. Shade Tree Planting | Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 1-L4. Co-Generation Facilities | Petaluma and the County |
| 2-L1. Solar in New Residential Development | Pacific Gas & Electric (PG&E), SCP, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Windsor |
| 2-L2. Solar in Existing Residential Buildings | PG&E, SCP, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 2-L3. Solar in New Nonresidential Developments | PG&E, SCP, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Windsor |
| 2-L4. Solar in Existing Nonresidential Buildings | PG&E, SCP, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Windsor, the County |
| 4-L1. Mixed-Use Development in City Centers and along Transit Corridors | Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 4-L2. Increase Transit Accessibility | SCTA, Sonoma County Transit, Petaluma Transit, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor |

| Measure | Responsible Entities |
|---|---|
| 4-L3. Supporting Land Use Measures | SCTA, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 4-L4. Affordable Housing Linked to Transit | SCTA, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor |
| 5-L1. Local Transportation Demand Management (TDM) Program | SCTA, Sonoma County Transit, Petaluma Transit, Cloverdale, Cotati, Healdsburg, Rohnert Park, Sebastopol, the County |
| 5-L2. Carpool Incentives and Ride-Sharing Program | SCTA, Sonoma County Transit, Petaluma Transit, Cloverdale, Cotati, Healdsburg, Rohnert Park, Sebastopol, the County |
| 5-L3. Guaranteed Ride Home | SCTA, Sonoma County Transit, Petaluma Transit, Cloverdale, Cotati, Sebastopol, the County |
| 5-L4. Supporting Bicycle/ Pedestrian Measures | SCTA, Sonoma County Transit, Petaluma Transit, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 5-L5. Traffic Calming | SCTA, Sonoma County Transit, Petaluma Transit, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 9-L1. Create Construction and Demolition Reuse and Recycling Ordinance | Sonoma County Waste Management Authority (SCWMA), Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 14-L1. Green Energy for Water Production and Wastewater Processing in Healdsburg and Cloverdale | Healdsburg, Cloverdale |
| **Group 2 – Implementation to start by 2018** | |
| **Regional Measures** | |
| 3-R1. Stationary Fuel Switching Incentives | SCP, Sonoma County Energy Independence Office, RCPA, Bay Area Air Quality Management District (BAAQMD), NSCAPCD |
| 7-R1. Shift Sonoma County (Electric Vehicles) | SCP, Sonoma County Energy Independence Office, RCPA, BAAQMD, NSCAPCD |
| 7-R2. Alternative Fuels for Transit Vehicles | SCTA, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus |
| 5-R4. Trip Reduction Ordinance (TRO) | SCTA, transit agencies, cities/County |
| 5-R5. Supporting Measures for the Transportation Demand Management (TDM) Program | SCTA, transit agencies, cities/County |
| 5-R6. Reduced Cost Transit Passes | SCTA, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus |
| 5-R7. Alternative Travel Marketing and Optimize Online Service | SCTA, Sonoma County Transit, Petaluma Transit, and Santa Rosa City Bus |

| Measure | Responsible Entities |
|---|---|
| 5-R8. Safe Routes to School | SCTA, cities/County |
| 5-R9. Car-sharing Program | SCTA, cities/County |
| 5-R10. Bike Sharing Program | SCTA, cities/County |
| 10-R1. Increase Landfill Methane Capture and Use for Energy | SCWMA, landfill owners/operators |
| 11-R1. Countywide Water Conservation Support and Incentives | SCWA, supported by local jurisdictions |
| 12-R1. Recycled Water | Water/wastewater service providers |
| 13-R1. Infrastructure and Water Supply Improvements | SCWA, other water/wastewater service providers |
| **Local Measures** | |
| 3-L1. Convert to Electric Water Heating | Pacific Gas & Electric, SCP, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Windsor |
| 7-L1. Electric Vehicle Charging Station Program | Pacific Gas & Electric, SCP, NSCAPCD, BAAQMD, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| On-Road-3. Neighborhood/Site Enhancement Strategies | Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 5-L6. Parking Policies | Cloverdale, Healdsburg, Sebastopol, the County |
| 5-L7. Supporting Parking Policy Measures | Cloverdale, Cotati, Healdsburg, Petaluma, Sebastopol, Sonoma, Windsor, the County |
| 8-L1. Idling Ordinance | Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, the County |
| 11-L1. SB X7-7 – Water Conservation Act of 2009 | SCWA, Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, Windsor, the County |
| 11-L2. Water Conservation for New Construction | SCWA, Petaluma, Rohnert Park, Sebastopol, Windsor |
| 11-L3. Water Conservation for Existing Buildings | SCWA, Petaluma, Rohnert Park, Sebastopol, Windsor |
| 12-L1. Greywater Use | SCWA, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Windsor, the County |
| **Group 3 – Implementation to start by end 2019** | |
| **Regional Measures** | |
| 13-R2. Wastewater Treatment Equipment Efficiency | Wastewater service providers: Cloverdale, Healdsburg, Petaluma, Santa Rosa, Windsor, Sonoma County Water Agency |
| 18-R3. Urban Agriculture | Cities/County |

| Measure | Responsible Entities |
|---|---|
| 20-R1. Measure and Track Consumption-based Emissions | Farmers, ranchers, RCPA, the County |
| 20-R2. Educate Consumers | Farmers, ranchers, RCPA, the County |
| 20-R3. Encourage Sustainable Consumption | Farmers, ranchers, RCPA, the County |
| 20-R4. Reduce carbon intensity of product supply chains | Farmers, ranchers, RCPA, the County |
| **Local Measures** | |
| 7-L2. Electrify Construction Equipment | BAAQMD, NSCAPCD, Cotati, Healdsburg, Petaluma, Sebastopol, Windsor |
| 8-L2. Idling Ordinance for Construction Equipment | BAAQMD, NSCAPCD, Petaluma, Rohnert Park, Sebastopol, , the County |

# 4.3 Funding and Financing

## 4.3.1 Plan Implementation Costs and Benefits

Responding to climate change will require public and private investment (costs). These costs are at least partially offset through direct economic benefits (like lower fuel cost) and through avoidance of future costs associated with unmitigated climate change impacts. Most GHG reduction measures in this CAP have a net positive economic result where savings exceed costs, especially in the long term.

Local governments will incur some costs by taking a leading role in responding to climate change. Costs will include staff time, community engagement, and direct investment for some measures (e.g., municipal infrastructure, energy purchases, and program administration).

The private sector – residents and businesses – will also incur costs associated with the implementation of this plan, mainly due to individual choices about how to participate in climate mitigation. Examples include costs to retrofit buildings and equipment, purchase new vehicles, install rooftop solar, or provide employee commute programs.

Public and private entities will also benefit financially by implementing climate action strategies. For many climate action measures, the financial benefits exceed the costs and generate a positive return on investment. These benefits can include reduced fuel, utility, and maintenance costs, higher property values, tax incentives, and rebates. There are many less direct benefits that are more difficult to evaluate financially including employee recruitment and retention, marketing and branding, building occupant health and productivity, and the other co-benefits introduced in Chapter 3.

Of course, looking exclusively at the traditional economic bottom line is insufficient when it comes to climate change.  The full value of co-benefits derived from an individual measure is very difficult to quantify. Even more challenging, the full social cost of inaction is impossible to quantify for an individual community. As Chapter 6 illustrates, climate change is generating local impacts with real economic implications. Flooding, fire, drought, and heat will create many economic risks: damage to buildings and infrastructure, impacts to human health and safety, rising health care and emergency services costs, pressure on food and water supply, rising energy costs, and unpredictable agricultural productivity.

Assessing specific measure costs and benefits – to the extent possible – will be an important step in implementing this climate action plan. It will be equally important to acknowledge that there are costs, benefits, challenges, and opportunities associated with mitigating and adapting to climate change, but they are costs and challenges that local and regional agencies can confidently confront head on, knowing that they are essential to the long-term economic well-being and safety of communities.

In confronting the costs of climate action, the RCPA and local governments will work to minimize costs and maximize local economic benefits by pursuing funding for implementation and facilitating financing tools to support regional investment.

### 4.3.2 Government Funding Strategies

Implementation of CA2020 will require considerable investment from multiple entities. RCPA will continue to strive for an overall funding approach that ensures that the emissions-reduction strategies will be funded and implemented efficiently and quickly by:

- Pursuing funding for strategies concurrently, whenever possible, to use funds most efficiently
- Leveraging federal, state, and regional grants and other funding sources
- Partnering with other communities and regional entities to administer joint programs, and partnering with the private sector on measure implementation
- Reducing barriers to private investment in climate solutions and supporting strategies to direct investments in energy, buildings, transportation, water, and other GHG sources toward low-carbon options
- Seeking long-term strategies to increase the amount of funding available for local climate action

Various funding options are available to support RCPA and local governments with implementation of emissions-reduction strategies. These options can provide initial capital, reduce overall program costs, and support long-term measure implementation. Appendix D provides information on specific funding and financing options that are currently available to the jurisdictions and that RCPA will pursue to support implementation.

Local jurisdictions are able to obtain funding from the California cap-and-trade program to support certain GHG emissions-reduction measures in CA2020. RCPA is continually monitoring the availability of funding from the sale of cap-and-trade proceeds and the applicability to local GHG emissions-reduction measures along with other sources that may be in development.

### 4.3.3 Private Sector Financing

Implementation of the emissions-reduction measures in CA2020 will result in costs *and* savings for residents, businesses, and other members of the community (please refer to Appendix C for a cost-effectiveness analysis for certain measures). In fact, most measures have a net positive economic result where savings exceed costs, especially in the long term. Financing tools can help offset the up-front costs of some cost-effective measures. An important role for RCPA and member agencies will be to facilitate sound investments in GHG reduction strategies that will maximize the overall economic return for residents, businesses, and the communities themselves.

For voluntary CA2020 measures (such as energy efficiency and solar retrofits for existing buildings), the private sector will incur associated costs and savings only for those strategies they choose to implement. Some of the measures, however, will be mandatory and will impose costs on public and private parties. The private-sector incentives and rebates identified in Chapter 3 and Appendix D can significantly improve the economics of individual projects. It is also important to note that the entity making the up-front investment may not be the same one that realizes the savings. For example, developers may invest in energy efficiency measures during construction, but it is the subsequent homeowners who will receive lower utility bills (although, with better energy disclosure requirements, buyers may be willing to pay more for an energy-efficient home).

## 4.4 Community Engagement

To help facilitate the community involvement described in Section 4.2.4, periodic public updates will provide information and inform each community regarding progress toward attaining the countywide 2020 emissions reduction target. These updates will provide opportunities for collaboration and an opportunity for the cities and the County to receive feedback on potential improvements or changes to the emissions-reduction measures. Other outreach activities, including online and social media, community presentations, event participation, and other strategies, will also be pursued to engage the public and solicit input, suggestions, and participation.

## 4.5 Evaluation and Monitoring

Regular monitoring is important to ensure that programs are functioning as they were originally intended and the desired GHG reduction outcome is achieved. CA2020 also will provide CEQA streamlining, which requires monitoring of the plan's progress towards achieving the adopted targets.

Early identification of effective strategies and potential issues will help the jurisdictions adapt and make informed decisions regarding priorities, funding, and scheduling.

RCPA will lead periodic updates of countywide emissions inventories and provide an annual report to document progress. The first inventory update will occur in 2016 based on data for calendar year 2015. Future inventory updates will be completed in 2018 and 2020 to inform further refinements to near- and long-term climate action strategies. These updated inventories will be presented to the RCPA Board and provided to the public in the annual report. SWG members will present the information to their governing boards. These updates are essential to understanding how successful existing efforts have been in reducing emissions, and how to further prioritize actions included in CA2020.

RCPA will also develop key program indicators that track specific reduction measures to evaluate how well local government strategies are working. To streamline this effort, RCPA will develop a custom tool to track the progress of the GHG reduction measures. This tool will contain the GHG reduction measures along with metrics, checklists, benchmarks, timelines, goals, key performance indicators, and other items identified by the RCPA Board and its member agencies as essential to the monitoring process. Possible tools for communicating the results of monitoring to the community include RCPA website dashboards and other tools that support local government reporting, such as the Statewide Energy Efficiency Collaborative ClearPath tool and existing community social media accounts.

## 4.6 Adaptive Management

### 4.6.1 Learning from What Works and What Doesn’t

Despite substantial progress in the past decade, climate action planning is still in its relative infancy. Technology, behavior, and mandates are constantly changing and not every new idea works as planned. Therefore, where program tracking, inventory updates, or other information indicates that the emissions-reduction measures are not being implemented or are not as effective as was originally anticipated, RCPA, the SWG, and the participating agencies will adaptively manage CA2020. The goal of adaptive management is to identify and correct ineffective measures quickly, make necessary corrections, and stay on track both toward the countywide GHG reduction target, and toward successful achievement of the level of GHG reduction agreed to by each participating agency through their adoption of reduction measures described in Chapter 5 of this plan. If the current reduction measures are inadequate to meet the reduction targets, they will be amended.

In order to be utilized for CEQA streamlining, CEQA Guideline 15183.5 requires that this plan “Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels.” In addition to the monitoring described in the previous section, RCPA will conduct a 2-year review of overall CA2020 effectiveness as part of its annual reporting in 2018. The review will include measure status and impact data updates and adjustments and amendments to the plan as necessary to meet the individual and countywide targets.

Ultimately, the purpose of monitoring and adaptive management is to ensure that the plan achieves the reduction target for the County as a whole as well as the level of GHG reduction targeted in each participating jurisdiction. If the current implementation measures are inadequate to meet the reduction targets, the plan will be amended to revise or add implementation measures.

### 4.6.2 Implementation Beyond 2020

CA2020 is critical local step toward a long-term future with drastically lower GHG emissions. The jurisdictions of Sonoma County are on the leading edge of promoting lower GHG emissions by pursuing a target of 25% below 1990 levels by 2020. This target is consistent with (and far exceeds) the goals and milestones outlined in Assembly Bill 32. Nonetheless, as 2020 approaches, statewide focus will shift to emissions reductions beyond 2020. This trend has been observed elsewhere through the United States, with New York City recently releasing a plan to reduce GHG emissions to 80% below 1990 levels by 2050. California Executive Order S-03-05, issued in 2005, articulates a similar long-term goal for the state. California Executive Order B-30-15, issued in April 2015, establishes an interim goal for the state to reduce GHG emissions to 40% below 1990 levels by 2030.

As part of CA2020 adoption, the RCPA will also adopt long-term goals consistent with those identified in the Executive Orders. The measures implemented by 2020 as part of this CAP put the county on a trajectory to meet these longer-term goals, and CA2020 measures will be the foundation for future climate action planning.

As noted in Chapter 3, a new phase of climate action planning will be needed after 2020 to expand and build upon the goals and strategies in CA2020 and take advantage of new technologies and climate protection science that are constantly evolving. RCPA and Sonoma County jurisdictions will need to develop plans for the future that build on the measures put in place under CA2020. The region will also most likely rely on further state and federal action to achieve post-2020 targets.

# 5. Community

## Community Greenhouse Gas Profiles and Emissions Reductions for 2020

# Chapter 5

# Community Greenhouse Gas Profiles and Emissions Reductions for 2020

This Chapter contains separate sections for each jurisdiction in a form that can be easily excerpted for use in the local adoption process. These sections provide key information about each jurisdiction, including demographic and socioeconomic data and forecasts, as well as a greenhouse gas (GHG) emissions profile for each.

The GHG emissions profile includes detail on each jurisdiction's main sources of emissions in the form of a "backcast" for 1990 emissions, a 2010 emissions inventory and emissions forecasts for 2015, 2020, 2040 and 2050 under business-as-usual (BAU) scenario (i.e., with no state, regional or local GHG reduction measures). The actions that each jurisdiction has already taken to reduce GHG emissions are also described.

Most importantly, these jurisdiction-specific sections show the local GHG reduction measures that each community will implement, and the expected GHG reductions that will be achieved by 2020. Together with state and regional GHG reduction measures, these local measures will achieve the regional target of a 25% emissions reduction (compared to 1990 levels) by 2020.

It should be noted that the City of Santa Rosa's section in this chapter incorporates by reference the previously adopted Climate Action Plan (2012) that will contribute significantly to reaching the regional CAP target for 2020.

Jurisdiction-specific sections are included as follows:

5.1 City of Cloverdale

5.2 City of Cotati

5.3 City of Healdsburg

5.4 City of Petaluma

5.5 City of Rohnert Park

5.6 City of Santa Rosa

5.7 City of Sebastopol

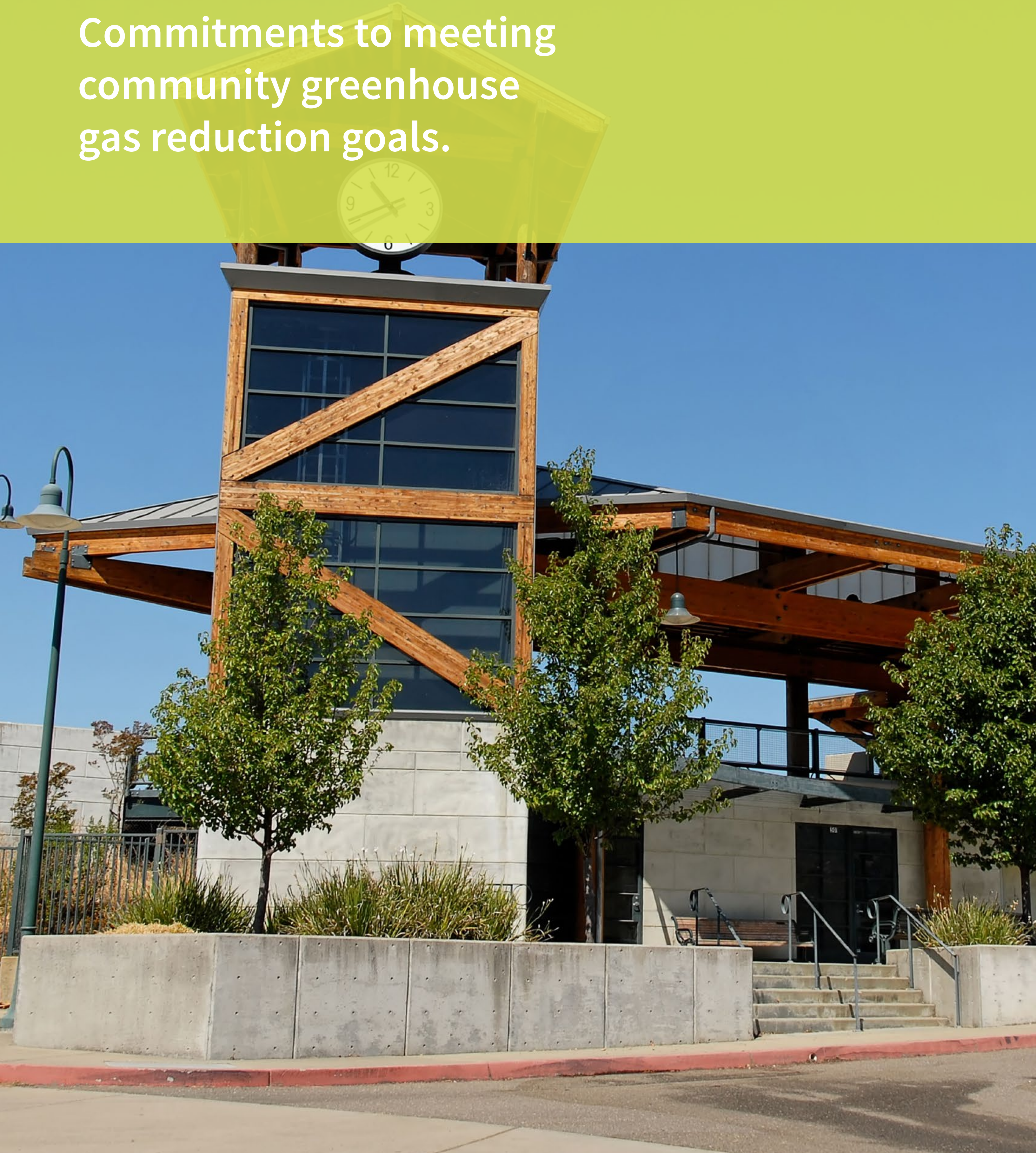
5.8 City of Sonoma

5.9 Town of Windsor

5.10 County of Sonoma

# Cloverdale

## Commitments to meeting community greenhouse gas reduction goals.



# 5.1 Cloverdale

This section presents the community greenhouse gas (GHG) emissions profile specific to Cloverdale and the measures that the City of Cloverdale will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.1.1 Community Summary

The City of Cloverdale is an attractive small town community that is home to many small local businesses, a thriving performing arts center, the annual Cloverdale Citrus Fair, and ample recreational opportunities. Cloverdale is the northernmost city in Sonoma County, located approximately 3 miles south of the Mendocino County-Sonoma County border and 30 miles north of Santa Rosa. The City's location along the major transportation corridors of Highway 101 and Highway 128 offers local economic development opportunities set in the picturesque Alexander Valley wine region. With proximity to urban centers (Santa Rosa, San Francisco, and Arcata/Eureka), Cloverdale is evolving as a smart-growth city with small town charm.

### Demographics

The City spans 2.7 square miles and had a population of 8,618 as of the 2010 census. By 2020 the population is expected to increase over 9% to 9,425, while employment is expected to increase by 8%. Cloverdale's demographic composition in 2010 was 75% White, 0.6% African American, 1.1% Native American, 1.1% Asian, 0.1% Pacific Islander, 17.8% from other races, and 4% from two or more races. Persons of Hispanic or Latino origin composed 33% of the population in 2010.

As shown in Table 5.1-1, Cloverdale is expected to experience steady growth in population, housing, and jobs in the future.

**Table 5.1-1. Cloverdale Socioeconomic Data**

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | **1990** | **2010** | **2015** | **2020** | **2040** | **2050** |
| Population | 4,924 | 8,618 | 9,015 | 9,425 | 10,952 | 11,651 |
| Housing | 1,868 | 3,249 | 3,432 | 3,625 | 4,230 | 4,495 |
| Employment | 2,455 | 3,012 | 3,624 | 3,928 | 4,324 | 4,492 |

Socioeconomic data were derived from the Sonoma County Transportation Authority travel demand model and incorporate input from the City based on its internal planning forecasts.

According to 2010 Census data, the majority of housing in the City of Cloverdale is owner-occupied with 66% of all housing units owned, and about 34% of housing units renter-occupied.

## Energy and Water Use

Compared to households in the county as a whole, Cloverdale households use less electricity but more natural gas and water. They also use less electricity, natural gas, and water than households statewide.

**Table 5.1-2. Cloverdale, County, and State 2010 Average Energy and Water Use (per household, per year)**

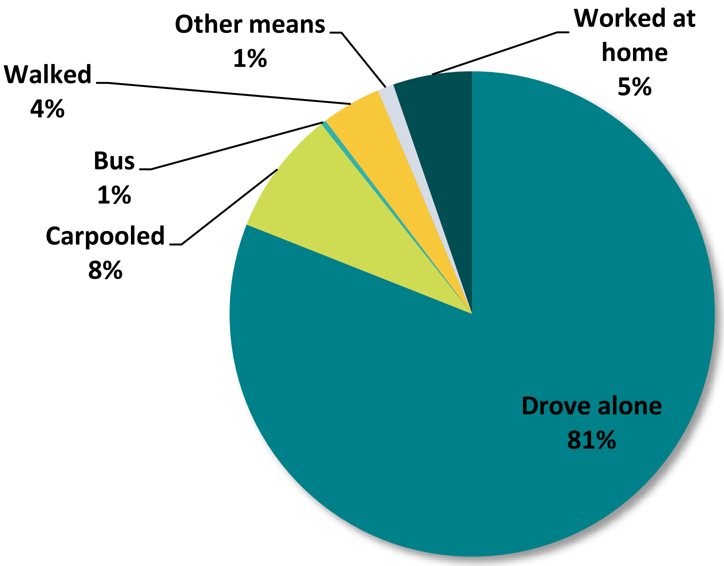
| | Cloverdale | County | State |
|---|---|---|---|
| Electricity (kWh) | 6,652 | 7,042 | 9,320 |
| Natural Gas (Therms) | 441 | 413 | 512 |
| Water Use (Gallons) | 88,256 | 75,810 | 107,869 |

Sources:
City Data: provided by PG&E (energy) and by the City of Cloverdale (water).
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In the inventory year 2010, most Cloverdale residents (81%) drove alone to work, with only 8% carpooling. This is typical and similar to the other communities in Sonoma County. Cloverdale is the northernmost city in the county and many people have to drive out of the City to work in Santa Rosa to the south, Ukiah to the north, or elsewhere in or out of the county. With the average trip to work for residents of Cloverdale taking 25.2 minutes, riding a bus is not a viable option due to time constraints as well as limited access and routes (U.S. Census Bureau 2014).

**Figure 5.1-1. Modes to Work in Cloverdale in 2010**



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

### 5.1.2 Cloverdale's Existing Actions to Reduce Greenhouse Gas Emissions

Cloverdale has already taken a number of steps to reduce energy use, promote renewable energy use, and other actions that have been helping to reduce greenhouse gas (GHG) emissions. The City has adopted the following ordinances and General Plan policies that help to reduce GHG emissions and will support implementation of the GHG reduction measures in CA2020.

- Building Energy
    - The City has adopted the California Green Building Standards Code, making the Tier 1 Voluntary measures for residential and non-residential structures mandatory requirements.
    - General Plan Policy 8-2: Use, support, and encourage energy and resource efficient methods in private construction. Study and develop ordinances and incentives to encourage energy efficient transportation, locally generated solar and alternative energy power sources, and green building methods for private buildings and projects. The City of Cloverdale Building Department has ongoing efforts to support solar power projects, locally generated solar and alternative energy power sources, and green building methods for private buildings and projects.
    - General Plan Policy CDO 8-1: Use energy and resource efficient methods in daily City operation. Where feasible, use energy efficient transportation, locally generated solar and alternative power sources, and green building methods for City buildings. This policy is ongoing. The City has not constructed or remodeled any City buildings.
- Land Use and Transportation
    - General Plan Policy LU 3-1: Develop an Urban Growth Boundary [UGB]. Protects important farmlands and open space from urban development (UGB Ordinance). City voters adopted Cloverdale's Urban Growth Boundary in 2010.
    - General Plan Policy CE 4-3: Support local, countywide, and regional bus service. Maintain and encourage use of the Cloverdale City bus by maintaining schedules that serve the community and by use of distinctive vehicles to bring visibility to the service. The City continues to support the use of public transportation in Cloverdale. Sonoma County Transit operates a shuttle bus that is accessible to all residents of the City.
    - General Plan Policy CE 3-1: Pedestrian and bike pathways. Provide an extensive network of pedestrian and bicycle pathways to support community health and provide a safe alternative to automobile use. Integrate routes with transit stops. The Sonoma County Transportation Authority (SCTA), in conjunction with the City, created a pedestrian and bike master plan for Cloverdale.
    - General Plan Policy CE 4-1: Participate in efforts to establish rail service on the SMART right of way. Encourage passage of rail bonds and develop appropriate land uses that will support rail ridership. The City supported the passage of the ballot measures to support

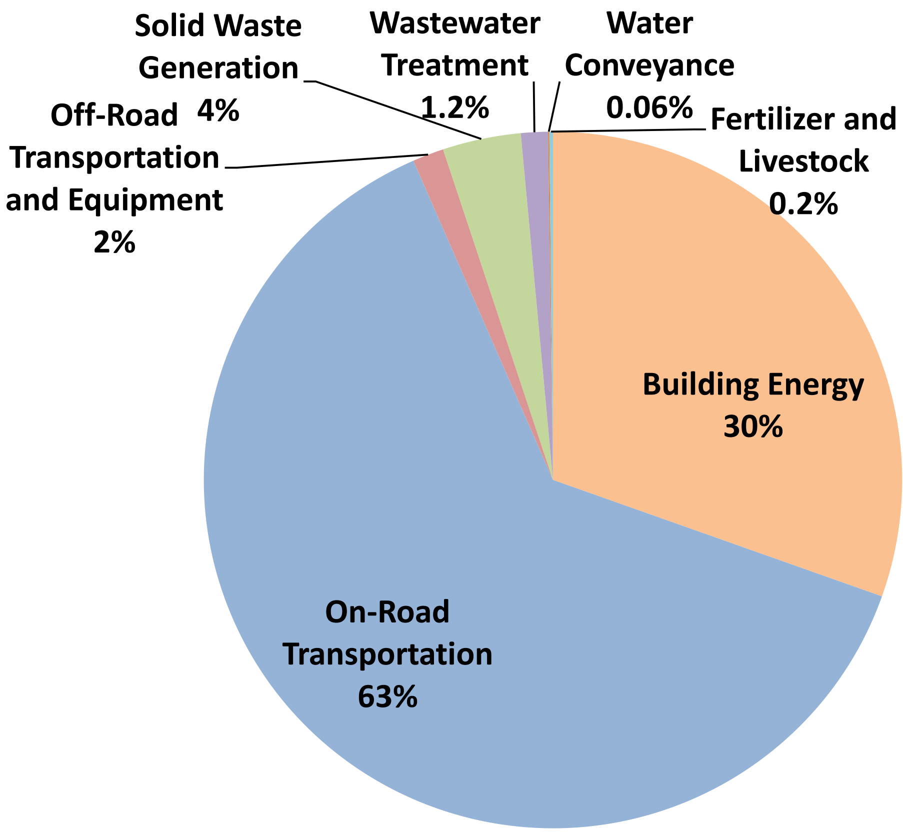
    the SMART Train. In anticipation of the SMART Train having a stop in Cloverdale, properties around the train station have been zoned for Transit Oriented Development.

  - General Plan Policy CDO 3-8: SMART station area plan. Develop Transit Oriented Development design plan before or concurrent with the Transit Oriented Development Specific Plan. The City adopted a Station Area Plan in 2010 that focuses on development around the SMART Train Station.
  - Trip Reduction Ordinance: Municipal Code Chapter 10.54. Requires employers within the City with 100 or more employees at individual job sites to disseminate trip reduction information on alternative transportation in addition to telecommuting, compressed work weeks, and flexible hours.
  - General Plan Policy CE-4-4: Encourage ridesharing to reduce commute trips. Coordinate with regional ridesharing plans. The City has worked with regional ridesharing plans to encourage residents and employees to use these programs.
- Waste Minimization and Recycling
  - Recycled Products Purchasing: Municipal Code Chapter 3.08.090.
  - General Plan Policy LU 9-1: Maintain waste management contracts and participation in countywide waste disposal facilities to accommodate household waste and to meet or exceed state and countywide recycling goals.
- Water and Wastewater Efficiency
  - General Plan Policy LU 6-1: Ensure adequate water and waste water capacities. Upgrade the City Wastewater Treatment Plant to provide tertiary treatment so that tertiary treated water can be distributed to new development, open space parks and other uses. Promote water conservation and encourage water conserving landscaping.
  - Water Efficient Landscape Ordinance: Municipal Code Chapter 15.30
- Agriculture
  - General Plan Policy LU 3-3: Protect Prime Farmland, Unique Farmland, and Farmland of Statewide Importance from urban development. Retain these farmland designations as Conservation Features under the Urban Growth Boundary Ordinance. City voters adopted the Urban Growth Boundary in 2010.
- Urban Forestry and Natural Areas
  - General Plan Policy CDO 6-2: Protect distinctive natural vegetation. Develop and urban forest/plan street tree plan with a management strategy for maintaining existing and newly planted trees, including best practice provisions for installation, maintenance, and succession planning.
  - General Plan Policy CDO 6-6: Prepare and urban forest/street tree plan. Design a program for new trees to be installed with development and a plan for retrofit in areas where development or streets were installed without trees.

  - General Plan Policy CDO 6-1: Maintain and expand the tree canopy within and outside the developed areas of the City. Develop and urban forest/plan street tree plan with a management strategy for maintaining existing and newly planted trees, including best practice provisions for installation, maintenance, and succession planning.
- General
  - General Plan Policy CDO 8-3: Inventory and Reduce Greenhouse Gas Emissions. Work with the Northern Sonoma County Air Pollution Control District and California Air Resources Board to prepare a Climate Action Plan inventorying current GHG emissions, emissions from 1990, and projected emissions for 2020.

### 5.1.3 Greenhouse Gas Inventory and Forecast

**Figure 5.1-2. Cloverdale 2010 Community GHG Inventory by Source**



Cloverdale's inventory is similar to other cities in the county and state. The majority of the GHG emissions are from transportation, from the combustion of fossil fuels in personal and light-duty vehicles. The next largest source is building energy, which includes emissions related to energy consumed for heating, cooling, lighting, and cooking in the residential, commercial, and industrial sectors. Residential uses account for most (69%) of the building energy emissions in Cloverdale.

Commercial uses account for 31% of building energy emissions. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

In Cloverdale, total GHG emissions generated by community activities in 2010 were 59,040 metric tons of carbon dioxide equivalent (MTCO$_2$e), which is approximately 2% of total countywide GHG emissions in the same year.[1] This is a 3% increase from estimated 1990 emissions, which were 57,330 MTCO$_2$e. Table 5.1-3 shows the 1990 backcast, the 2010 inventory and business-as-usual (BAU) forecasts for 2015, 2020, 2040 and 2050 for the City of Cloverdale.

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[1] Sonoma County total GHG emissions in 2010 were 2.6 million metric tons of CO$_2$e.

## Table 5.1-3. Cloverdale Community GHG Backcast, Inventory, and Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 12,920 | 23% | 17,990 | 30% | 20,880 | 30% | 22,250 | 30% | 25,450 | 27% | 26,840 | 29% |
| On-road Transportation | 36,510 | 64% | 37,270 | 63% | 44,160 | 64% | 46,380 | 63% | 61,310 | 66% | 60,200 | 64% |
| Off-road Transportation and Equipment | 610 | 1% | 860 | 1% | 1,090 | 2% | 1,320 | 2% | 2,560 | 3% | 2,690 | 3% |
| Solid Waste | 6,550 | 11% | 2,140 | 4% | 2,390 | 3% | 2,540 | 3% | 2,880 | 3% | 3,030 | 3% |
| Wastewater Treatment | 420 | 1% | 740 | 1.3% | 770 | 1% | 810 | 1% | 940 | 1% | 1,000 | 1% |
| Water Conveyance | 320 | 1% | 30 | 0.1% | 40 | 0% | 40 | 0% | 40 | 0% | 50 | 0% |
| **Total** | **57,330** | **100%** | **59,040** | **100%** | **69,320** | **100%** | **73,340** | **100%** | **93,170** | **100%** | **93,790** | **100%** |
| **Per-Capita Emissions** | **11.6** | | **6.9** | | **7.7** | | **7.8** | | **8.5** | | **8.1** | |

### 5.1.4 Greenhouse Gas Reduction Goal and Measures

The City of Cloverdale joins the other Sonoma County communities to support the regional GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 20 local greenhouse gas reduction measures. The City's GHG emissions under 2020 business-as-usual (BAU) conditions (in absence of state, regional, and local reduction measures) would be approximately 73,340 MTCO$_2$e. The City's local GHG reduction measures, in combination with state and regional measures, would reduce the City's GHG emissions in 2020 to 50,530 MTCO$_2$e, which would be a reduction of approximately 31% compared to 2020 BAU conditions. The City will achieve these reductions through a combination of state (72%), regional (21%), and local measures (7%) that are technologically feasible and cost-effective per Assembly Bill (AB) 32. With the reduction measures in CA2020, per-capita emissions in Cloverdale will be 5.4 MTCO$_2$e per person, a 54% reduction in per capita emissions compared to 1990.

**Table 5.1-4. Cloverdale 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

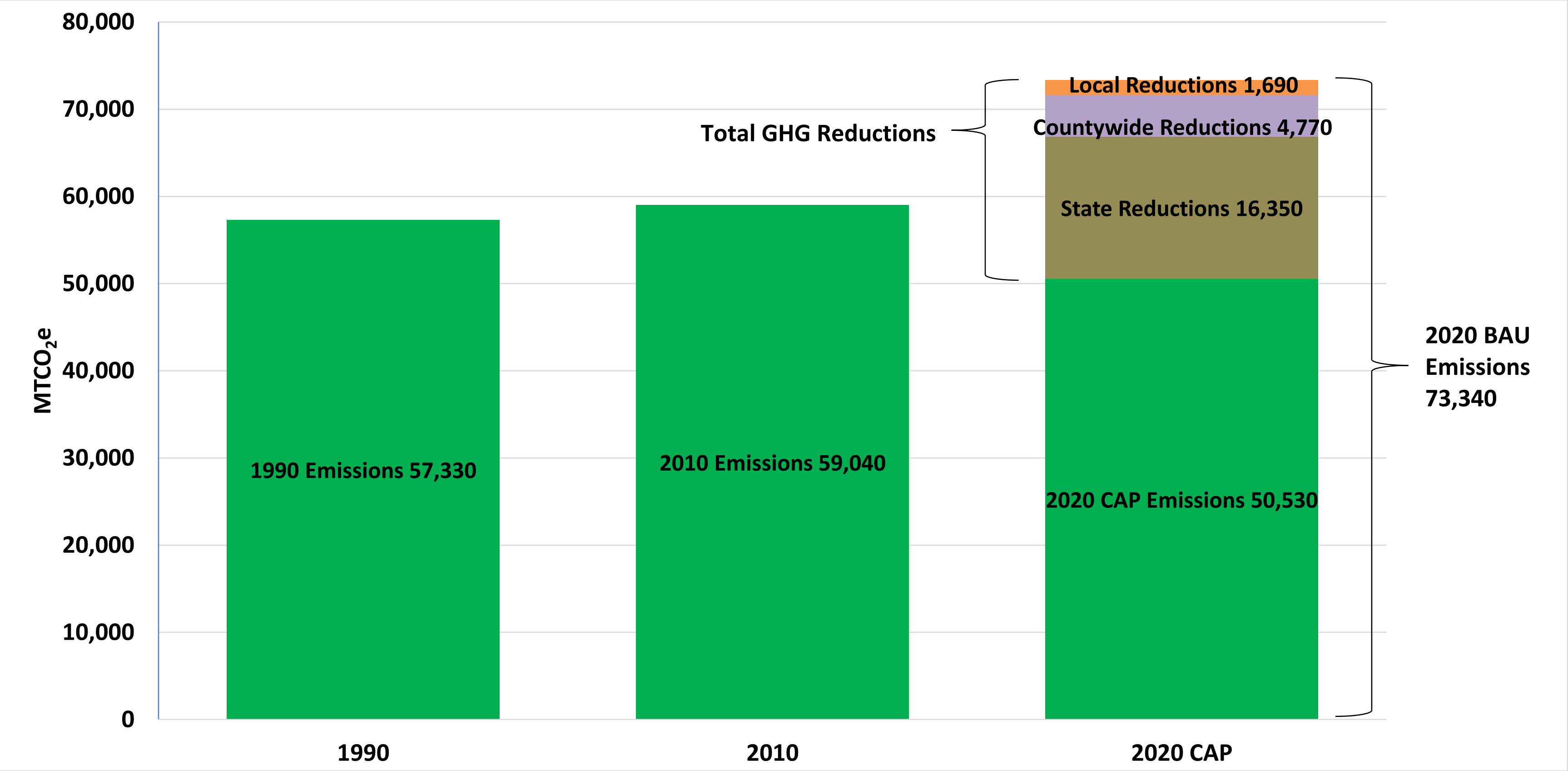
| | 2020 BAU | 2020 Reductions | | | | | |
|---|---|---|---|---|---|---|---|
| Source | Forecast | State | County-wide | Local | Total | 2020 CAP Emissions | % Reduction from BAU |
| Building Energy | 22,250 | 5,290 | 1,610 | 370 | 7,270 | 14,980 | 33% |
| On-road Transportation | 46,380 | 10,940 | 1,230 | 560 | 12,730 | 33,650 | 27% |
| Off-road Transportation and Equipment | 1,320 | 120 | - | - | 120 | 1,210 | 9% |
| Solid Waste | 2,540 | - | 1,920 | - | 1,920 | 620 | 75% |
| Water Conveyance | 40 | - | 10 | 750 | 760 | -[1] | 100% |
| Wastewater Treatment | 810 | - | 10 | - | 10 | 790 | 2% |
| **Total Emissions** | 73,340 | 16,350 | 4,770 | 1,680 | 22,810 | 50,530 | 31% |
| | | **72%** | **21%** | **7%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures reduce improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.1-3 shows Cloverdale's 1990 and 2010 GHG emissions total, 2020 BAU emissions forecast total, and the total emissions remaining after implementation of the City's reduction measures. The contribution of state, regional, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emissions reductions achieved in 2020. Like the other communities, Cloverdale benefits greatly from the work the state and regional entities are committed to implementing on climate action. See Chapter 4 for more information on state and regional actions.

Figure 5.1-3. Cloverdale 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions



## Greenhouse Gas Reduction Measures

As shown in Table 5.1-5, the City of Cloverdale will achieve its reduction goal through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the City to comply with state mandates (e.g., Title 24 energy efficiency measures). State measure reductions total 16,350 $MTCO_2e$, including the Pavley vehicle fuel efficiency standards, Title 24 building standards, the state's low carbon fuel standard, and the Renewables Portfolio Standard (RPS).

Regional measures will reduce emissions by 4,770 $MTCO_2e$ and will be implemented by regional entities, including the Regional Climate Protection Authority (RCPA), Sonoma County Water Agency (SCWA), County of Sonoma Energy and Sustainability Division (ESD), Sonoma County Transportation Authority (SCTA), and Sonoma Clean Power (SCP).

An additional reduction of 1,690 $MTCO_2e$ will be achieved through locally adopted measures relevant to the City of Cloverdale. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent the actions that local communities can take directly. The communities have selected the local measures that best suit the needs of their community.

The three measures that will have the greatest impact in Cloverdale are, in order of importance, Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009), Measure 2-L4 (Solar in Existing Non-Residential Buildings), and Measure 5-L2 (Carpool-Incentives & Ride-Sharing Program). These three measures, in addition to reducing GHG emissions, will save energy, improve air quality and public health in the City, and conserve natural resources. As the county and state continue to experience a historic drought, water conservation will remain an especially important co-benefit.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the City. Of the regional measures, the measures with the greatest impact include the Community Choice Aggregation (CCA) measure and the waste-to-energy measure.

Table 5.1-5 presents the individual GHG reduction measures that Cloverdale has selected for the CAP. For more information on the specifics of each measure, see Appendix C.

**Solar Water and Wastewater Treatment Plants in Cloverdale**

In 2014, Cloverdale approved a Power Purchase Agreement to finance solar panel arrays at the City's water and wastewater treatment plants. The City expects that the water and wastewater treatment plants will be supplied by 100% solar energy when the project is fully up and running.

## Table 5.1-5. Cloverdale 2020 GHG Emissions Reductions by Measure

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **State and Regional Measures** | | |
| **Goal 1: Increase Building Energy Efficiency** | **1,364** | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 540 | N/A |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 452 | N/A |
| Measure 1-S3: Industrial Boiler Efficiency | - | N/A |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 41 | N/A |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 331 | N/A |
| **Goal 2: Increase Renewable Energy Use** | **5,532** | |
| Measure 2-S1: Renewables Portfolio Standard | 4,272 | N/A |
| Measure 2-S2: Solar Water Heaters | 24 | N/A |
| Measure 2-R1: Community Choice Aggregation | 1,237 | N/A |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **891** | |
| Measure 5-R1: Improve and Increase Transit Service | 3 | N/A |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A |
| Measure 5-R4: Trip Reduction Ordinance | 185 | N/A |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A |
| Measure 5-R6: Reduced Transit Passes | 171 | N/A |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 137 | N/A |
| Measure 5-R8: Safe Routes to School | 394 | N/A |
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **10,944** | | |
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 10,205 | N/A | |
| Measure 6-S2: Advanced Clean Cars | 329 | N/A | |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 410 | N/A | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **452** | - | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 117 | N/A | |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 335 | N/A | |
| **Goal 9: Increase Solid Waste Diversion** | **739** | | |
| Measure 9-R1: Waste Diversion Goal | 739 | N/A | |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **1,176** | | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 1,176 | N/A | |
| **Goal 11: Reduce Water Consumption** | | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | NQ | |
| **Goal 12: Increase Recycled Water and Greywater Use** | **<1** | | |
| Measure 12-R1: Recycled Water* | <1 | N/A | |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **24** | - | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 10 | N/A | |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 14 | N/A | |
| **Local Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **1** | | |
| Measure 1-L3: Shade Tree Planting | 1 | 100 | trees planted |

| **State, Regional, and Local Measures** | **2020 GHG Reductions** | **Participation Rate** | |
|---|---|---|---|
| **Goal 2: Increase Renewable Energy Use** | **373** | | |
| Measure 2-L2: Solar in Existing Residential Building | 107 | 5% | of existing homes with solar |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 267 | 10% | of existing non-residential development with solar |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **36** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 29 | 15% | of growth to result in mixed use |
| Measure 4-L2: Increase Transit Accessibility | 3 | 5% | of growth to be 25+ units |
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| Measure 4-L4: Affordable Housing Linked to Transit | 4 | 15% | of new development to be affordable |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **525** | | |
| Measure 5-L1: Local Transportation Demand Management Program | 137 | 38% | of employees eligible |
| Measure 5-L2: Carpool-Incentives & Ride-Sharing Program | 247 | 71% | of employees eligible |
| Measure 5-L3: Guaranteed Ride Home | NQ | Yes | |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 35 | 90% | of trips affected |
| Measure 5-L6: Parking Policies | 106 | 10% | of area affected |
| Measure 5-L7: Supporting Parking Policy Measures | NQ | Yes | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **1** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 1 | 2 | charging stations installed |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | NQ | Yes | |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 8: Reduce Idling** | | | |
| Measure 8-L1: Idling Ordinance | NQ | 2 | minutes below state law |
| **Goal 9: Increase Solid Waste Diversion** | **<1** | | |
| Measure 9-L1: Create Construction and Demolition Reuse and Recycling Ordinance | <1 | 3% | beyond baseline |
| **Goal 11: Reduce Water Consumption** | **522** | | |
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 522 | 20% | Reduction in per capita water use |
| **Goal 14: Increase Use of Renewable Energy in Water and Wastewater Systems** | **227** | | |
| Measure 14-L1: Green Energy for Water Production and Wastewater Processing in Healdsburg and Cloverdale* | 227 | Yes | |
| **State Measure Reductions in Cloverdale** | **16,350** | | |
| **Regional Measure Reductions in Cloverdale** | **4,770** | | |
| **Local Measure Reductions in Cloverdale** | **1,680** | | |
| **Grand Total Emissions Reductions in Cloverdale** | **22,810** | | |

*Measures reduce emissions from multiple sources (i.e. water and energy)

NQ = not quantified

### 5.1.5 Municipal Greenhouse Gas Reduction Measures

Like the other cities and the county, Cloverdale has recognized the need to reduce GHG emissions from municipal operations. The City has existing programs in place for green municipal buildings and alternative fuels for its municipal fleet. Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. Cloverdale and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# Cotati

## Commitments to meeting community greenhouse gas reduction goals.

# 5.2 Cotati

This section presents the community greenhouse gas (GHG) emissions profile specific to Cotati and the measures that the City of Cotati will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.2.1 Community Summary

Located at the crossroads of Highways 101 and 116, the City of Cotati's early history as a trade center for surrounding agricultural lands, has earned its nickname, "The Hub."  Cotati has a wide spectrum of housing types which accommodate a variety of lifestyles from large lot, animal-friendly rural living, to suburban neighborhoods with easy access to shopping, to dense, compact, and walkable urban living. The City has an energetic and involved business community that offers the full array of goods and services and a small but vibrant downtown. Cotati is home to a clean light-industrial area and is proud of its focus on infill development and "green" priorities for new building. Sonoma State University is nearby, and with initiation of service, SMART trains will stop at the City's newly completed train depot and transit hub.

The heart of Cotati is La Plaza Park, located within the historic hexagonal plaza, a designated state historical landmark. La Plaza Park hosts a number of annual events throughout the year including the annual Kids' Day Parade and Festival, the summertime Farmers' Market, the Cotati Jazz Festival, Oktoberfest, and the annual Holiday Tree Lighting Celebration. The annual Cotati Accordion Festival is the largest accordion festival in California.

### Demographics

Cotati spans 1.9 square miles and had a population of 7,265 as of the 2010 census. In 2020 its population is expected to be 7,777, an increase of 7% over 2010. Employment in the area is expected to increase by 15%. Cotati's demographic composition in 2010 was 82% White, 2% African American, 1% Native American, 4% Asian, 0.4% Pacific Islander, 6% from other races, and 5% from two or more races. Persons of Hispanic or Latino origin were 17%.

As shown in Table 5.2-1, the City is expected to experience steady growth in population, housing, and jobs in the future.

### Table 5.2-1. Cotati Socioeconomic Data

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | 1990 | 2010 | 2015 | 2020 | 2040 | 2050 |
| Population | 5,714 | 7,265 | 7,483 | 7,777 | 8,809 | 9,404 |
| Housing | 2,281 | 3,041 | 3,162 | 3,321 | 3,777 | 4,028 |
| Employment | 2,940 | 3,217 | 3,413 | 3,714 | 4,302 | 4,502 |

Socioeconomic data were derived from the SCTA travel demand model and incorporate input from the City based on its internal planning forecasts.

According to the 2010 US Census, City of Cotati housing is majority owner-occupied with 59% of housing units owned and 41% rented.

## Energy and Water Use

Compared to households in the county as a whole, Cotati households use less electricity, natural gas, and water. They also use less electricity, natural gas, and water than households statewide.

### Table 5.2-2. Cotati, County, and State 2010 Average Energy and Water Use (per household, per year)

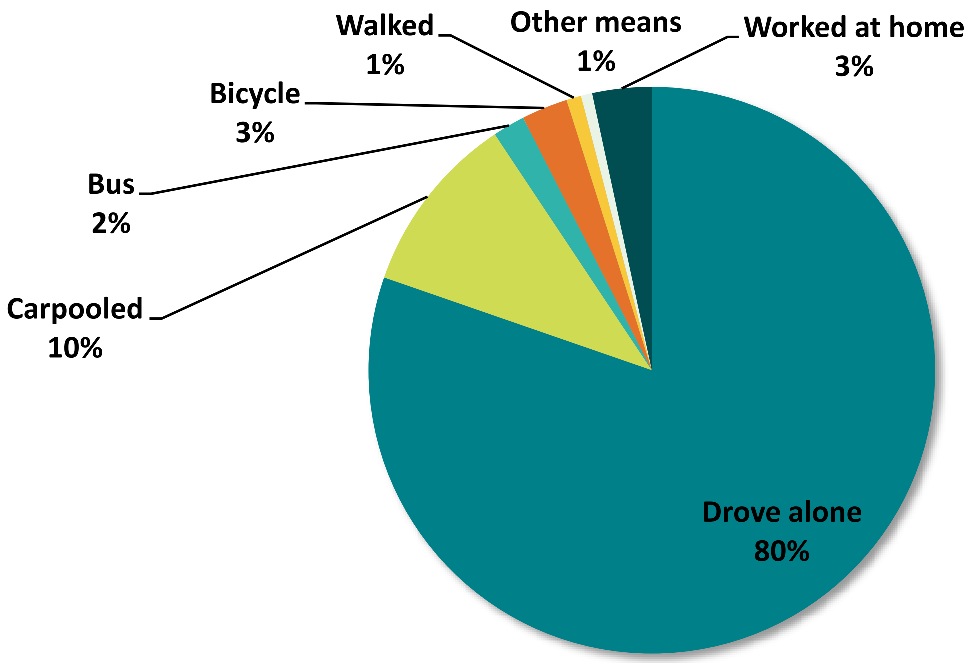
| | Cotati | County | State |
|---|---|---|---|
| Electricity (kWh) | 6,051 | 7,042 | 9,320 |
| Natural Gas (Therms) | 395 | 413 | 512 |
| Water Use (Gallons) | 60,624 | 75,810 | 107,869 |

Sources:
City Data: provided by PG&E (energy) and by the City of Cotati Urban Water Management Plan.
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In the inventory year 2010, most Cotati residents drove alone to work, and about 10% carpooled. For many residents of Cotati, alternative transportation options are not available for their commute trip. With the average trip to work for residents of Cotati taking 26.9 minutes, and limited bus service, riding a bus is not a viable option for many Cotati residents (U.S. Census Bureau 2014).

Figure 5.2-1. Modes to Work in Cotati in 2010



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

### 5.2.2 Cotati's Existing Actions to Reduce GHG Emissions

Cotati has already taken a number of steps to reduce energy use, promote renewable energy use, and other actions that have been helping to reduce GHG emissions.

- Building Energy
  - Residential Retrofits: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
  - Residential Appliance Upgrades: Programs through Pacific Gas & Electric Company (PG&E) and other agencies.
  - Solar Installations at Residences: Energy Upgrade California in Sonoma County – Whole House Upgrade Program. Streamlined permitting through Building Department.
  - Solar Sonoma County program.
- Land Use and Transportation
  - Focus on Infill Development: The General Plan update in 2015 includes several tools to incentivize new development in areas of the City that are along or near major transportation corridors. In addition, both the Downtown and Santero Way Specific Plans call for walkable, mixed use development with a combination of jobs and housing.
  - Traffic Signal Synchronization: Synchronization occurs with new development when installation of a new signal is required.

  - Increased Transit Infrastructure: Installation of three electric vehicle charging stations in 2012 at City Hall. In addition to the SMART service mentioned below, additional infrastructure such as a train depot, SCTA Park-n-Ride facility, new sidewalks, expanded bicycle parking, and bus turnouts are all being provided adjacent to the rail service line.
  - Increased Transit Service: Coordination of construction of SMART Train facilities at Santero Way and East Cotati Avenue. Facilities include construction of depot building, SCTA Park-n-Ride, and Smart Train service.
  - Bicycle and Pedestrian Master Plan: Long range bicycle and pedestrian planning goals and policies.
- Solid Waste
  - Methane capture occurs at the Santa Rosa Sub-regional Treatment Plant, which serves Cotati.
- Water and Wastewater Efficiency
  - Efficiency Upgrades: One of the goals of the City's water conservation program is to reduce wastewater generation by increasing indoor water conservation. Initiation of efforts to increase efficiency of waste collection system which reduces pumping—installation of more energy efficient pumps, and installation of a new Supervisory Control and Data Acquisition (SCADA) system, which enables off-peak pumping times.
  - Water Fixture Retrofits: Higher efficiency requirements (low flow toilets, showers, and faucets) required at the time of new development or significant remodel of existing. City coordinates water audit (performed by City of Santa Rosa and paid for out of water use fees).
  - Greywater or Recycled Water: Greywater retrofit parts/equipment provided, along with informational seminars provided by Daily Acts and paid for by the City.

The City has adopted the following ordinances and General Plan policies that also help to reduce GHG emissions and would support the implementation of the formal GHG reduction measures presented herein.

- Building Energy
  - Alternative Energy – General Plan Policy: Chapter 5 – Policy 3.3. Promote the use of alternative energy in new development.
  - CALGreen Building Code: Municipal Code Chapter 14.04.130. Makes Tier 1 mandatory for new residential and non-residential structures.
  - Green Building – General Plan Policy: Chapter 7 – Policy LU 1.5. Use sustainable best management practices (BMPs) in green building, stormwater management, and conservation to mitigate infrastructure impacts, while minimizing effects on water, sewer, and energy.

  - Green Building BMPs – General Plan Policy: Chapter 5 – Policy CON 3.2. Support innovative green building practices and encourage development to exceed CALGreen Tier 1 standards.
  - Heating Devices – General Plan Policy: Chapter 5 – Policy CON 2.4. Require new development to install only fireplaces, stoves, and/or heaters to meet current Bay Area Air Quality Management District (BAAQMD) standards.
- Land Use and Transportation
  - Improve air quality through managed growth – General Plan Policy: Chapter 5 – Policy CON 2.1. Focus City growth in and around existing urbanized areas, locating new housing near employment, encouraging alternative transportation, and requiring developers to mitigate air quality impacts.
  - Development Layout and Design – General Plan Policy: Chapter 5 – Policy CON 3.10. Ensure new development and significant remodels encourage the use of alternative transportation modes.
  - Transportation Demand Management – General Plan Policy: Chapter 2 – Policy CI 3.3. Work with local employers and institutions to implement Transportation Demand Management (TDM) programs such as subsidized transit passes, carpool matching, telecommuting, and car-sharing, etc.
  - Transit Oriented Development. All street classifications above residential alley, include provisions for bicycle and pedestrian facilities (Chapter 17.26 of Land Use Code). The Santero Way Specific Plan is a transit oriented plan for the area of East Cotati Avenue adjacent to the rail tracks. Future development will comprise a mix of uses and will utilize design standards to further the goals of reducing vehicle miles traveled.
  - Parking Policies: Mandatory bike parking for all multi-family and non-residential development. Chapter 17.36 of Muni Code.
  - Sonoma State Traffic Reduction – General Plan Policy: Chapter 2 – Policy CI 3.4. Coordinate with Sonoma State University to minimize traffic impacts.
  - Idling Ordinance. Restrictions are placed on idling of construction vehicles as mitigation measures to new projects.
  - Alternative Transportation – General Plan Policy: Chapter 5 – Policy CON 2.12. Minimize single passenger motor vehicle use. Encourage alternative modes and services.
  - Park-And-Ride Lots – General Plan Policy: Chapter 2 – Policy CI 3.2. Increase the number of trips made by transit and carpooling by identifying locations for park-and-ride lots.
  - Street Design – General Policy: Chapter 5 – Policy CON 3.6. Street design and layout should reduce the use of pavement where possible to reduce cooling energy needs.
- Waste Minimization and Recycling

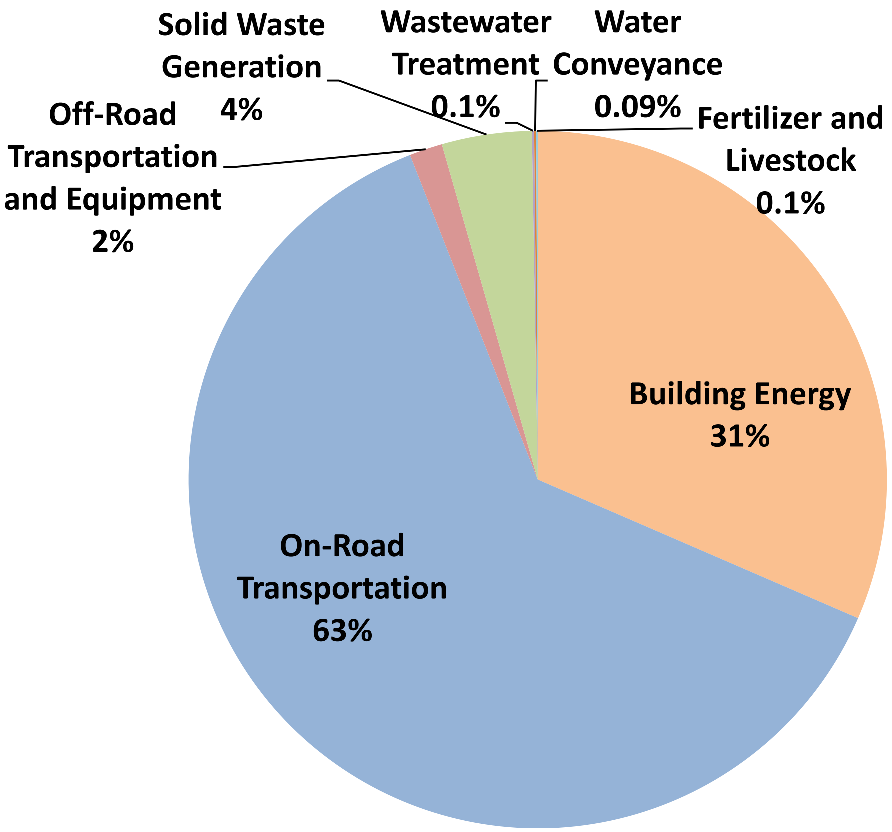
  - Waste and Recycling Services – General Plan Policy: Chapter 4 – Policy CSF 3.1. Provide adequate waste disposal, recycling and reuse services.
  - Solid Waste Reduction – General Plan Policy: Chapter 4 – Policy CSF 3.2. Reduce solid waste and increase reduction, reuse, and/or recycling in Compliance with Countywide Integrated Waste Management Plan.
  - Resource Recovery – General Plan Policy: Chapter 4 – Policy CSF 3.4. Require and/or support the operation of resource recovery facilities by the City waste hauler.
  - City Operations – General Plan Policy: Chapter 4 – Policy CSF 3.5. City operations should use recycled materials whenever feasible.
  - Green Waste – General Plan Policy: Chapter 4 – Policy CSF 3.8. Require new or significantly remodeled development to incorporate sufficient, attractive and convenient interior and exterior storage for recyclables and green waste.
  - Re-use of materials – General Plan Policy: Chapter 4 – Policy CSF 3.6. Support programs that re-use recycled materials and solid waste, such as the use of biomass waste for energy production.
  - Solid Waste – General Plan Policy: Chapter 5 – Policy CON 3.12. Continue efforts to reduce solid waste.
- Water and Wastewater Efficiency
  - Funding – General Plan Policy: Chapter 4 – Policy CSF 2.20. Ensure adequate funding is available to improve wastewater conveyance infrastructure to reduce storm water infiltration.
  - Recycled Water – General Plan Policy: Chapter 4 – Policy CSF 2.12. Use recycled water for landscaping irrigation at City parks and City facilities.
  - Wastewater Procurement – General Plan Policy: Chapter 4 – Policy CSF 2.11. Procure recycled water supplies from the Santa Rosa Subregional Wastewater Treatment and Reclamation System where economically feasible. Water Efficient Landscaping Standards: Establishes requirements for landscaping to control soil erosion, conserve water, improve soil quality, enhance the appearance of development projects, screen potentially incompatible land uses, preserve the integrity of neighborhoods, improve pedestrian and vehicular traffic and safety, improve ecosystem services, water infiltration, and air quality, and reduce heat and glare.
  - Water Conservation Toilet Retrofit Ordinance for Non-Residential Customers: Municipal Code Chapters 13.72 and 13.73. Requires the installation of Water Sense toilets at the time of any change in water service by residential and nonresidential customers, respectively.
  - Drought Tolerance – General Plan Policy: Chapter 5 – Policy CON 3.9. Require the use of drought-tolerant and regionally native plants in landscaping.

  - Conservation – General Plan Policy: Chapter 5 – Policy CON 3.8. Promote water conservation among water users.
- Agriculture
  - Urban Agriculture – General Plan Policy: Chapter 3 – Policy CHW 3.3. Recognize that urban agriculture has the potential to reduce overall energy consumption and lower food costs. Land Use Code Animal Keeping regulations are very generous; chicken keeping is allowed in most residential zones.
- Urban Forestry and Natural Areas
  - Open Space Conservation: Several General Plan policies call for preservation and provision of active parks.
  - Tree Planting: Chapter 17.54 of the Land Use Code requires a permit to remove all trees over 12 inches in diameter. Removal must be for good cause and typically requires replacement at a ratio of at least 1:1.
  - Watercourse and Riparian Resource Protection: Municipal Code Chapter 17.50. Provides standards for the protection of watercourse and riparian resources within the City, including provisions for adequate buffer areas between watercourses and adjacent development, to retain the watercourses as valuable natural, scenic, and recreational amenities as appropriate.
  - Required Plantings: Municipal Code Chapter 11.10.030. Every new project for which a building or other City permit is required, and/or where construction of gutter and sidewalk is necessary, shall include full street-tree planting.
  - Deciduous Trees – General Plan Policy: Chapter 5 – Policy CON 3.15. Plant and maintain deciduous native trees on Old Redwood Hwy to provide a street canopy.
  - Tree Planting for Climate Protection – General Plan Policy: Chapter 5 – Policy CON 3.7. Encourage tree planting as wind breaks and as a way of reducing summer temperatures.
  - Carbon Sequestration – General Plan Policy: Chapter 5 – Policy CON 2.11. Preserve, protect and enhance the City's carbon sequestration resources to improve air quality.
- General
  - Resource Conservation: Municipal Code Chapter 17.51. Standards for all proposed development and new land uses to reduce per capita energy consumption and its contributions to global greenhouse gas production, potable water consumption and resulting wastewater production, and solid waste production.
  - GHG and Businesses – General Plan Policy: Chapter 5 – Policy CON 2.10. Encourage local businesses and industries to reduce GHG and energy consumption.
  - City Facilities – General Plan Policy: Chapter 5 – Policy CON 2.6. Reduce GHG emissions from City facilities to 30% below 1990 levels by 2015 consistent with 2008 GHG Emissions Reduction Action Plan.

- Climate Action Plan – General Plan Policy: Chapter 5 – Policy CON 2.8. Support development and implementation of a Climate Action Plan.
- Regional Coordination of GHGs – General Plan Policy: Chapter 5 – Policy CON 2.9. Consolidate efforts with other jurisdictions to reduce countywide GHGs.
- Support for Climate Action 2020 – General Plan Policy: Chapter 2 – Policy CI 3.1. Actively support RCPA in its goals for Climate Action 2020.

### 5.2.3 Greenhouse Gas Inventory and Forecast

**Figure 5.2-2. Cotati 2010 Community GHG Inventory by Source**



Cotati's inventory is similar to other cities in the county and state. The majority of the GHG emissions result from fossil fuel combustion in personal and light-duty vehicles. The next largest source is building energy, which includes emissions related to energy used to heat the homes and businesses in Cotati. Residential uses account for most (64%) of the building energy emissions in Cotati. Commercial uses account for 36% of total building energy emissions. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

In Cotati, total GHG emissions generated by community activities in 2010 were 52,060 $MTCO_2e$, which is approximately 1% of countywide GHG emissions in the same year. This is a 1% increase from estimated 1990 emissions, which were 51,480 $MTCO_2e$.

### Table 5.2-3. Cotati Community GHG Backcast, Inventory, and Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 14,650 | 28% | 16,410 | 32% | 18,160 | 32% | 19,330 | 32% | 22,130 | 32% | 23,430 | 33% |
| On-Road Transportation | 29,840 | 58% | 32,570 | 63% | 35,790 | 62% | 38,320 | 62% | 41,650 | 60% | 41,980 | 59% |
| Off-Road Transportation and Equipment | 710 | 1% | 800 | 2% | 950 | 2% | 1,160 | 2% | 2,290 | 3% | 2,420 | 3% |
| Solid Waste | 5,640 | 11% | 2,170 | 4% | 2,270 | 4% | 2,410 | 4% | 2,760 | 4% | 2,920 | 4% |
| Wastewater Treatment | 40 | 0% | 50 | 0.1% | 60 | 0% | 60 | 0% | 60 | 0% | 70 | 0% |
| Water Conveyance | 600 | 1% | 50 | 0.1% | 60 | 0% | 60 | 0% | 80 | 0% | 80 | 0% |
| **Total** | **51,480** | **100%** | **52,060** | **100%** | **57,280** | **100%** | **61,350** | **100%** | **68,980** | **100%** | **70,900** | **100%** |
| **Per-Capita Emissions** | **9.0** | | **7.2** | | **7.7** | | **7.9** | | **7.8** | | **7.5** | |

### 5.2.4 Greenhouse Gas Reduction Goal and Measures

The City of Cotati joins the other Sonoma County communities to support the regional GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 22 local GHG reduction measures. The City's GHG emissions under 2020 BAU conditions (in absence of state, regional, and local reduction measures) would be approximately 61,350 MTCO$_2$e. The City's local GHG reduction measures, in combination with state and regional measures, would reduce the City's GHG emissions in 2020 to 42,010 MTCO$_2$e, which would be a reduction of approximately 32% compared to 2020 BAU conditions. The City will achieve these reductions through a combination of state (71%), regional (21%), and local measures (8%) that are technologically feasible and cost-effective per AB 32. With the reduction measures in CA2020, per-capita emissions in Cotati will be 5.4 MTCO2e per person, a 40% reduction in per capita emissions compared to 1990.

**Table 5.2-4. Cotati 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

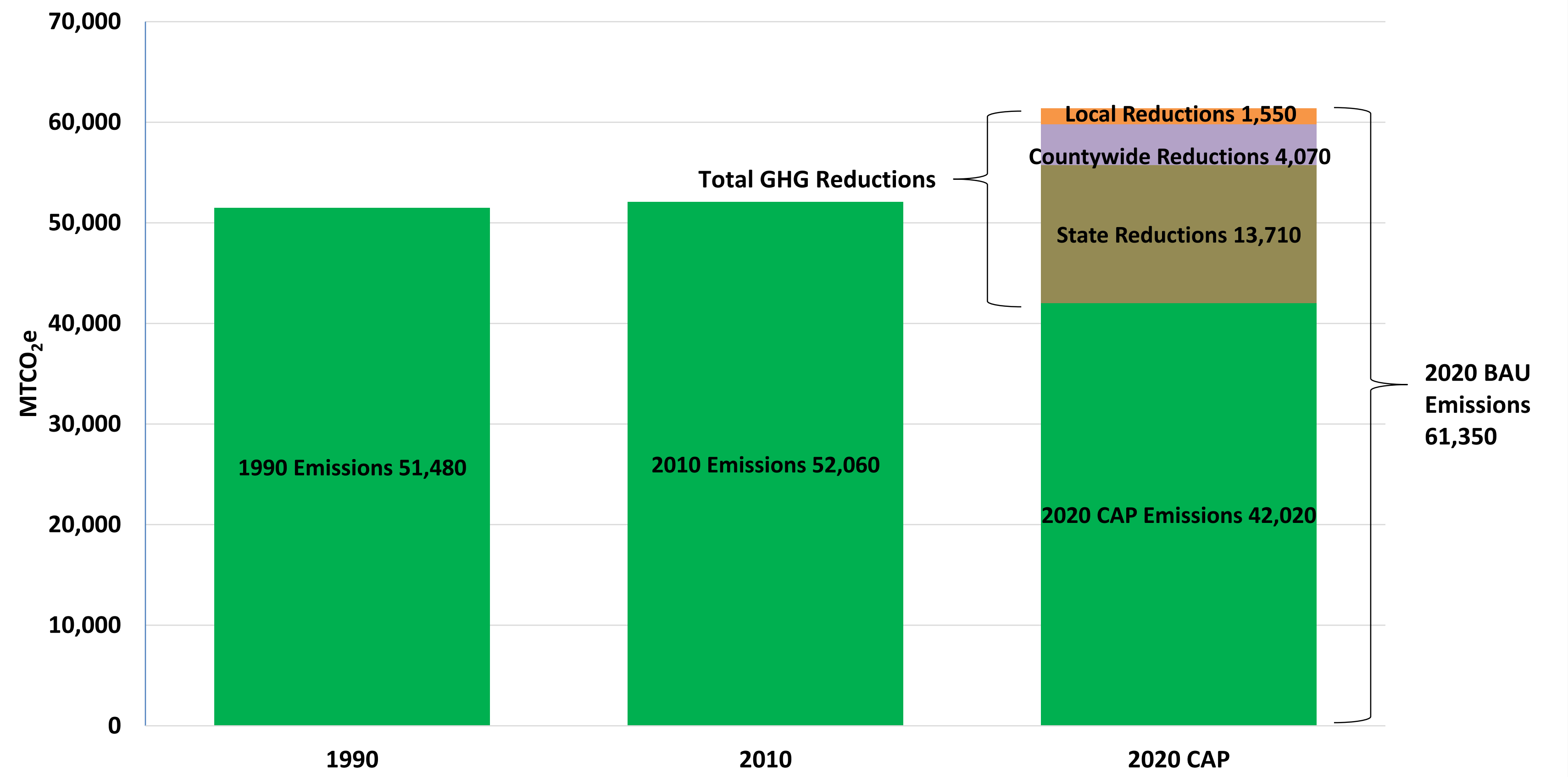
| | | Reductions | | | | | |
|---|---|---|---|---|---|---|---|
| **Source** | **2020 BAU Forecast** | **State** | **County-wide** | **Local** | **Total** | **2020 CAP Emissions** | **% Reduction From BAU** |
| Building Energy | 19,330 | 4,710 | 1,380 | 660 | 6,740 | 12,580 | 35% |
| On-Road Transportation | 38,320 | 8,900 | 820 | 460 | 10,170 | 28,150 | 27% |
| Off-Road Transportation and Equipment | 1,160 | 100 | - | 20 | 130 | 1,040 | 11% |
| Solid Waste | 2,410 | - | 1,820 | | 1,820 | 590 | 75% |
| Water Conveyance | 60 | - | 50 | 410 | 460 | -[1] | 100% |
| Wastewater Treatment | 60 | - | 10 | - | 10 | 50 | 17% |
| **Total Emissions** | **61,350** | **13,710** | **4,070** | **1,550** | **19,330** | **42,010** | **32%** |
| | | **71%** | **21%** | **8%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures reduce improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.2-3 shows Cotati's 1990 and 2010 GHG emissions total, 2020 BAU emission forecast total, and total emissions remaining after implementation of the City's reduction measures. The contribution of state, regional, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emission reductions achieved in 2020. Like the other jurisdictions, Cotati benefits greatly from the work the state and regional entities are committed to implementing on climate action. See Chapter 4 for more information on state and regional actions.

Figure 5.2-3. Cotati 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions



## Greenhouse Gas Reduction Measures

To help reach the community goals, Cotati will adopt a set of reduction measures through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the City to comply with state mandates (e.g., Title 24 energy efficiency measures). State measure reductions total 13,710 $MTCO_2e$, which include the Pavley vehicle fuel efficiency standards, Title 24 building standards, the state's low carbon fuel standard, and the RPS. These will reduce GHG emissions from Cotati's on-road, off-road, and building energy sources in 2020.

Regional measures will reduce emissions by 4,070 $MTCO_2e$ and will be implemented by regional entities, including the Regional Climate Protection Authority (RCPA), Sonoma County Water Agency (SCWA), County of Sonoma Energy Independence Office (ESD), Sonoma County Transportation Authority (SCTA), and Sonoma Clean Power (SCP).

An additional reduction of 1,550 $MTCO_2e$ will be achieved through locally adopted measures specific to the City of Cotati. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent actions that local communities can take directly. The communities have local control over their infrastructure and policies and have selected the local measures that best suit the needs of their community.

The three measures that will have the greatest impact in Cotati are, in order of importance, Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009), Measure 2-L4 (Solar in Existing Non-Residential Buildings), and Measure 2-L2 (Solar in Existing Residential Building). These three measures, in addition to reducing GHG emissions, will save energy and conserve natural resources. As the county and state continue to experience a historic drought, water conservation will remain an especially important co-benefit.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the City. Of the regional measures, the measures with the greatest impact include the Community Choice Aggregation (CCA) measure and the waste-to-energy measure.

Table 5.2-5 presents the individual GHG reduction measures that Cotati has selected for the CAP. For more information on the specifics of each measure, see Appendix C.

**City of Cotati Sustainable Building Program**

Since 2004, the City of Cotati has had a sustainable building program that is mandatory for new residential and commercial buildings, and for certain additions and remodels to existing buildings. Though now superseded by the CalGreen program, the City has been requiring more efficient energy and other building standards as well as lower water use.

## Table 5.2-5. Cotati 2020 GHG Emissions Reductions by Measure

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **State and Regional Measures** | | |
| **Goal 1: Increase Building Energy Efficiency** | **1,037** | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 308 | N/A |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 442 | N/A |
| Measure 1-S3: Industrial Boiler Efficiency | - | N/A |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 46 | N/A |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 240 | N/A |
| **Goal 2: Increase Renewable Energy Use** | **5,048** | |
| Measure 2-S1: Renewables Portfolio Standard | 3,936 | N/A |
| Measure 2-S2: Solar Water Heaters | 22 | N/A |
| Measure 2-R1: Community Choice Aggregation | 1,091 | N/A |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **537** | |
| Measure 5-R1: Improve and Increase Transit Service | <1 | N/A |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A |
| Measure 5-R4: Trip Reduction Ordinance | 119 | N/A |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A |
| Measure 5-R6: Reduced Transit Passes | 110 | N/A |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 88 | N/A |
| Measure 5-R8: Safe Routes to School | 222 | N/A |
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **8,901** | | |
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 8,293 | N/A | |
| Measure 6-S2: Advanced Clean Cars | 260 | N/A | |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 349 | N/A | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **382** | - | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 103 | N/A | |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 279 | N/A | |
| **Goal 9: Increase Solid Waste Diversion** | **709** | | |
| Measure 9-R1: Waste Diversion Goal | 709 | N/A | |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **1,111** | | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 1,111 | N/A | |
| **Goal 11: Reduce Water Consumption** | | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | N/A | |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **13** | - | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 3 | N/A | |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 10 | N/A | |
| **Goal 14: Increase Use of Renewable Energy in Water and Wastewater Systems** | **45** | | |
| Measure 14-R1: Sonoma County Water Agency Carbon Free Water by 2015 | 45 | N/A | |
| **Local Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **48** | | |
| Measure 1-L2: Outdoor Lighting | 47 | 50% | of outdoor lighting to participate |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 1-L3: Shade Tree Planting | 1 | 100 | trees planted |
| **Goal 2: Increase Renewable Energy Use** | **611** | | |
| Measure 2-L1: Solar in New Residential Development | 17 | 50% | of new houses to participate |
| Measure 2-L2: Solar in Existing Residential Building | 176 | 15% | of existing homes with solar |
| Measure 2-L3: Solar in New Non-Residential Developments | 12 | 10% | of new non-residential development to participate |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 405 | 15% | of existing non-residential development with solar |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **163** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 145 | 70% | of growth to result in mixed use |
| Measure 4-L2: Increase Transit Accessibility | 12 | 15% | of growth to be 25+ units |
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| Measure 4-L4: Affordable Housing Linked to Transit | 6 | 15% | of new development to be affordable |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **289** | | |
| Measure 5-L1: Local Transportation Demand Management Program | 88 | 38% | of employees eligible |
| Measure 5-L2: Carpool-Incentives & Ride-Sharing Program | 172 | 78% | of employees eligible |
| Measure 5-L3: Guaranteed Ride Home | NQ | Yes | |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 29 | 100% | of trips affected |
| Measure 5-L7: Supporting Parking Policy Measures | NQ | Yes | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **26** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 3 | 5 | charging stations installed |
| Measure 7-L2: Electrify Construction Equipment | 23 | 10% | of equipment |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | NQ | Yes | |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 8: Reduce Idling** | | | |
| Measure 8-L1: Idling Ordinance | NQ | 2 | Minutes below state law |
| **Goal 9: Increase Solid Waste Diversion** | **<1** | | |
| Measure 9-L1: Create Construction and Demolition Reuse and Recycling Ordinance | <1 | 3% | beyond baseline |
| **Goal 11: Reduce Water Consumption** | **414** | | |
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 414 | 20% | Reduction in per capita water use |
| **State Measure Reductions in Cotati** | **13,710** | | |
| **Regional Measure Reductions in Cotati** | **4,070** | | |
| **Local Measure Reductions in Cotati** | **1,550** | | |
| **Grand Total Emissions Reductions in Cotati** | **19,330** | | |

*Measures reduce emissions from multiple sources (i.e. water and energy)

NQ = not quantified

### 5.2.5 Municipal Greenhouse Gas Reduction Measures

Like the other cities and the county, Cotati has recognized the need to reduce GHG emissions from municipal operations. The City has existing programs in place for green municipal buildings and alternative fuels for its municipal fleet. Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. Cotati and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# Healdsburg

## Commitments to meeting community greenhouse gas reduction goals.

# 5.3 Healdsburg

This section presents the community greenhouse gas (GHG) emissions profile specific to Healdsburg and the measures that the City of Healdsburg will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.3.1 Community Summary

Healdsburg is a historic, small town centered on a 19th-century plaza. Located approximately 22 miles inland and 12 miles north of Santa Rosa, Healdsburg is situated among three important wine-producing regions: Russian River, Dry Creek, and Alexander Valley American Viticultural Areas. Composed of small and globally-recognized businesses, renowned restaurants, local hotels and bed and breakfasts, as well as outdoor recreation; Healdsburg welcomes guests year-round to enjoy small town charm, beautiful natural scenery, and wine country hospitality. Healdsburg has been recognized as one of the top 10 smallest towns in America and was most recently recognized as one of the best towns for the holidays.

Healdsburg, its residents, and community are dedicated to preserving the City's rich history and ensure a healthy future for generations to come. In order to achieve these goals, the City of Healdsburg adopted a 5-year strategic plan called "Pathway to Sustainability." The first strategic initiative of this plan, Quality of Life, identifies Promoting Environmental Sustainability as one of its priorities.

Unique to Healdsburg as a member of the Sonoma County CAP is the City's electric utility. Since 1899, the City of Healdsburg has owned and operated its own Electric Utility. Over the last 100 plus years, the City has moved from a small hydro generation plant in the Black Mountains to owning generation plants throughout northern California, maintaining over 60 miles of high voltage distribution lines with safety and reliability ratings well exceeding statewide averages.

Through the City's ownership of geothermal power plants at the Geysers and hydro-electric plants in Calaveras County, the City provides a high level of renewable and carbon-free energy to its customers. The City regularly surpasses the state's Renewable Portfolio Standard (RPS) requirements (20% by December 31, 2013; 25% by December 31, 2016; and 33% by 2020) and is well positioned to meet new RPS requirements proposed in SB 350 (50% by 2030). In most years, the City's electricity ranges from 50 to 60% carbon free, with over 43% of that energy coming from renewable energy provided by the Geysers. In addition, the City offers a Green Electric Rate, which allows customers to use 100% renewable energy. The City of Healdsburg's commitment to highly renewable and carbon-free sources of power reflect the importance of, and our community's commitment to, environmental stewardship and climate change mitigation.

### Demographics

The City of Healdsburg spans 4.5 square miles and had a population of 11,254 as of the 2010 census. In 2020 the population of Healdsburg is expected to be 11,402, an increase of 1.3% over

2010. Employment in the area is expected to increase by 1%. Healdsburg's demographic composition in 2010 was 74% White, 0.5% African American, 2% Native American, 1% Asian, 0.2% Pacific Islander, 19% from other races, and 3% from two or more races. Persons of Hispanic or Latino origin were 34%.

As shown in Table 5.3-1, growth in population, housing, and jobs in the City is expected to occur slowly.

**Table 5.3-1. Healdsburg Socioeconomic Data**

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | **1990** | **2010** | **2015** | **2020** | **2040** | **2050** |
| Population | 9,469 | 11,254 | 11,285 | 11,402 | 11,799 | 12,002 |
| Housing | 3,613 | 4,471 | 4,483 | 4,530 | 4,687 | 4,768 |
| Employment | 6,926 | 7,351 | 7,399 | 7,447 | 7,447 | 7,447 |

Socioeconomic data were derived from the SCTA travel demand model and incorporate input from the City based on its internal planning forecasts.

According to the 2010 Census, most housing in Healdsburg is owner-occupied (58%) with the remaining 42% renter-occupied.

## Energy and Water Use

Compared to county averages, Healdsburg households use less electricity but more natural gas and water. Compared to statewide averages, Healdsburg households use less electricity, natural gas, and water.

**Table 5.3-2. Healdsburg, County, and State 2010 Average Energy and Water Use (per household, per year)**

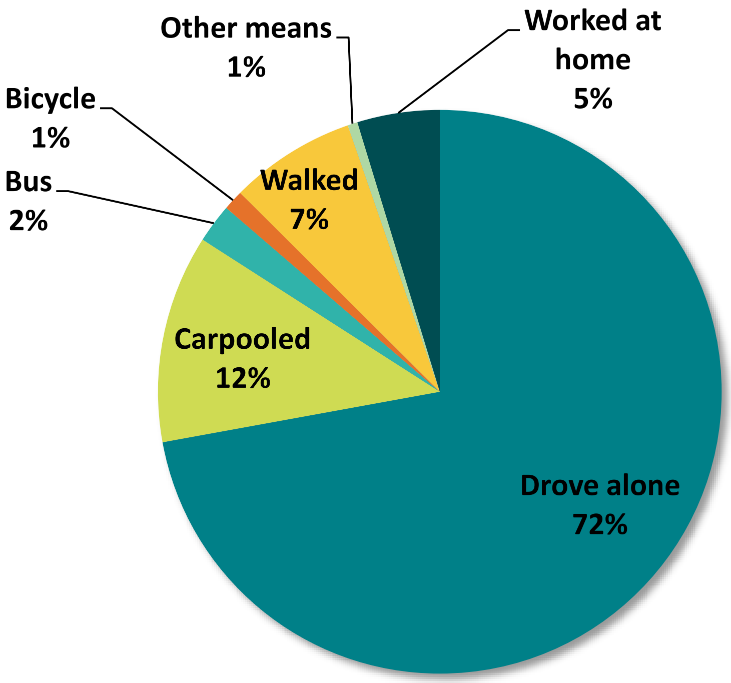
| | Healdsburg | County | State |
|---|---|---|---|
| Electricity (kWh) | 6,331 | 7,042 | 9,320 |
| Natural Gas (Therms) | 500 | 413 | 512 |
| Water Use (Gallons) | 90,362 | 75,810 | 107,869 |

Sources:
City Data: provided by the City of Healdsburg (electricity & water) and by PG&E (natural gas).
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In the inventory year 2010, Healdsburg had the highest rate in the county of residents walking to work although, in general, most residents drive alone to work. The City is working to increase alternative options with the transportation measures adopted through this plan. According to 2010 Census data, the average trip to work takes about 20.6 minutes, which is shorter than the county average of 25.3 minutes (U.S. Census Bureau 2014).

**Figure 5.3-1. Modes to Work in Healdsburg in 2010**



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

## 5.3.2 Healdsburg's Existing Actions to Reduce GHG Emissions

Healdsburg has already taken a number of steps to reduce energy use, promote renewable energy use, as well as other actions that have been helping to reduce GHG emissions. These actions include ordinances and General Plan policies that will support the implementation of the formal GHG reduction measures in this CAP.

- Building Energy
  - Residential Retrofits: The City's Utility Department offers a free home energy audit to identify retrofit potential.
  - Residential Retrofits – Residential Weatherization & Sealing: Program offering rebates for home insulation, replacement windows and treatments, HVAC repair, duct insulation and sealing, blower-door tests, roof radian barrier, and cool roof.
  - Residential Retrofits - Lighting: Program offering rebates for light-emitting diode (LED) bulbs and holiday light strings.

  - Residential Appliance Upgrades: Program offering rebates for Energy Star® refrigerators as well as dishwashers and clothes washers (when the household has an electric hot water heater).
  - Residential Appliance Upgrades: Program offering rebates for energy efficient heat pumps, HVAC units, and electric hot water heaters.
  - Residential Pool Pumps: Program offering a rebate for upgrading current pool pumps to an energy efficient variable-speed pump.
  - Solar Installations at Residences: Per CA SB-1, Healdsburg residents may be eligible to offset part or all of their electric usage with a solar photovoltaic (PV) system. Tax credits may also be available to help with the installation of a PV system.
  - Commercial Energy Efficiency Program: The City offers a customizable commercial rebate program that pays customers based on the first year's energy savings and peak demand reduction.
  - City Electric Department's commitment to renewable energy: Clean resource mix exceeds state-mandated requirements. Much of energy used from geothermal and hydro.
  - Green Building Program: Municipal Code Chapter 15.16 requires California Green Building Code compliance above and beyond the State Building Standards when any of the following are triggered:
    - Reconstruction of residential buildings of any size - Mandatory Measures.
    - New residential construction over 3,000 sqft - Tier 1 Residential.
    - Reconstruction of nonresidential buildings containing 5,000 sqft or more - Mandatory Measures.
    - New nonresidential construction over 10,000 sqft - Tier 1 Nonresidential.
  - Compliance with accepted GHG reduction goals: General Plan Policy NR-E-3. The City will comply with California's Publicly Owned Utilities' Principles Addressing Greenhouse Gas Reduction Goals.
  - Sustainable building practices: General Plan Policy NR-E-4. The City will support sustainable development and building practices and lead by example in municipal projects.
- Land Use and Transportation
  - Bicycle and Pedestrian Master Plan: Detailed citywide non-motorized transportation plan.
  - Foss Creek Pathway Plan: 4.1 mile bike path running north–south through Healdsburg. Connects to Old Redwood Highway and Windsor.
  - Transit Oriented Development: General Plan Policy NR-F-2. The City will promote land use patterns that support the use of transit systems and pedestrian and bicycle facilities.

- Land use surrounding transit: General Plan Policy LU-F-1. Land uses adjacent to transit facilities should derive maximum benefit from transit facilities and may include retail, office, employment and higher-density residential uses.
- Mixed-use development: General Plan Policy LU-F-2. The City shall encourage mixed use development around the historic railroad depot to support transit use.
- Bicycle-Transit Accommodations: Healdsburg Bicycle and Pedestrian Master Plan Policy 3.3 - Encourage regional transit providers to accommodate bicyclists on transit vehicles and plan for the need for additional bicycle storage capacity.
- Safe-Routes-To-Transit Program: Healdsburg Bicycle and Pedestrian Master Plan Policy 3.1 - Develop and implement a safe-routes-to-transit program that places a high priority on pedestrian and bike access to transit stops and centers.
- Bicycle Detection: Healdsburg Bicycle and Pedestrian Master Plan Policy 2.2. Where feasible, ensure that new and rehabilitated signalized intersections include bicycle detection and are properly marked and operational for use by bicyclists.
- Maintain transit service: General Plan Policy T-E-3 - The City shall encourage Sonoma County Transit (SCT) to maintain, at a minimum, present level of service.
- Coordinate transit infrastructure: General Plan Policy T-E-6 - The City shall work with SCT to coordinate stop locations and bus schedules for easy transfers.
- Multi-modal integration: General Plan Policy T-D-5 - The City shall promote and facilitate the use of bikes with other transportation modes.
- Support alternative transportation: General Plan Policy T-D-1 and T-D-3 - Encourage alternative transportation modes by establishing a bike and pedestrian network interconnecting residential areas with recreation, shopping, employment, commuting and local transportation.
- Traffic calming: General Plan Policy T-B-4 - Traffic calming measures will be considered to maintain reasonable speeds on City streets and improve pedestrian and bicycle safety.
- Support communitywide transit operation: General Plan Policy NR-F-1 - The City will encourage the use of transit systems and other alternatives to automobile use.
- Running of engines while stopped: Municipal Code Chapter 10.28.160 - Emitting vehicles shall be turned off while stopped. Ord. 1005 § 2, 2003. Code 1964 § 12.32.130.
- Trip Reduction Ordinance: All employers within the City of Healdsburg with 100 or more employees at an individual job site shall disseminate trip reduction information regarding transportation alternatives including carpools, vanpools, transit and bicycling, and other methods of reducing trips such as telecommuting, compressed work week, and flexible work hours annually to each employee and to all new employees as they are hired.
- Water and Wastewater Efficiency Resolution No. 58-2013: Stage 1 Voluntary Water Conservation Measures. Seeks a 20% reduction in water consumption from 2012.

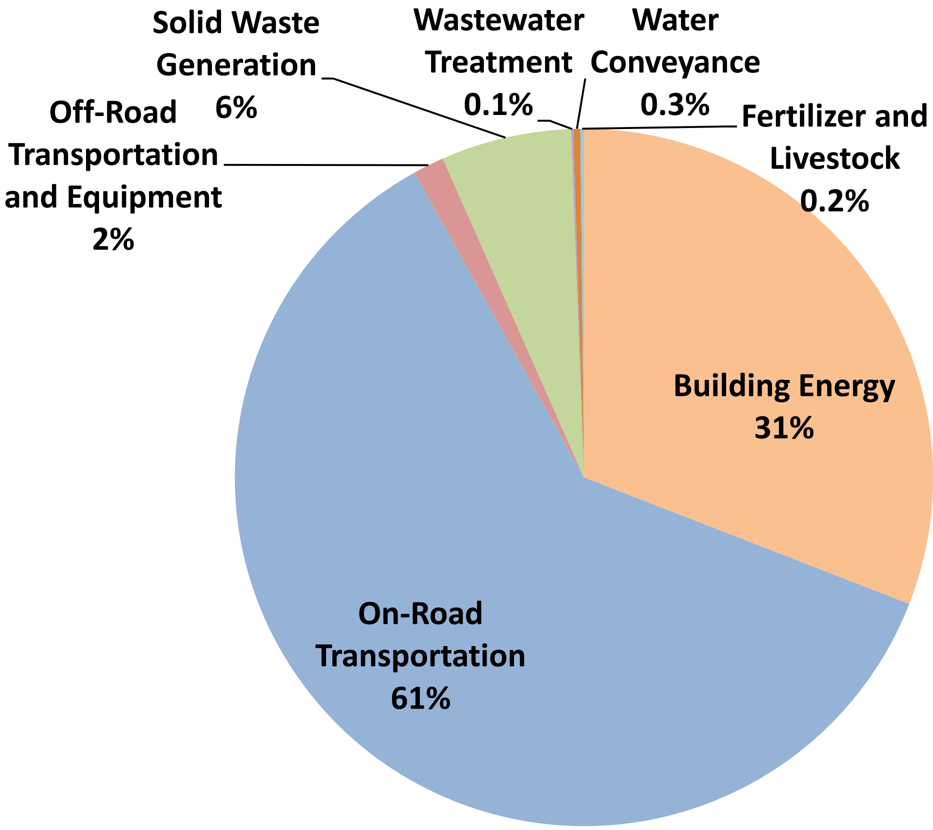
    - Ordinance No. 1077: Water Shortage Emergency Plan. City adopts Water Conservation Measures to be implemented in times of critical shortage.
    - Water Shortage Emergency Declaration Resolution No. 8-2014: Stage 2 Mandatory Water Conservation Measures – Requires implementation of Water Conservation Measures identified in the Water Shortage Emergency Plan.
    - Water Efficient Landscape Ordinance No. 1091: The ordinance promotes the efficient design and installation of water-efficient landscapes in Healdsburg associated with new construction and substantial alterations of existing development where landscapes are proposed.
- Agriculture
    - Agricultural uses outside UGB: General Plan Policy NR-D-2 - The City will encourage the County to retain agricultural uses on lands surrounding the Urban Service Area.
    - Sustainable agriculture: General Plan Policy NR-D-4 - The City will promote the sustainability of local agriculture.
- Urban Forestry and Natural Areas
    - Protect natural features: General Plan Policy NR-C-1 - New development shall not be allowed to breach the Urban Growth Boundary except under the exceptional circumstances allowed by this General Plan.
    - Open space acquisition: General Plan Policy NR-B-5 - The City will work with Sonoma County Agricultural Preservation and Open Space District, the Sonoma Land Trust and other non-profit conservation organizations and agencies in acquiring and maintaining key open space and habitat areas where such an arrangement would benefit both the City and the property owner.
    - Maximize tree protection: General Plan Policy NR-B-3 - New development shall be sited to maximize the protection of native tree species, riparian vegetation, important concentrations of native plants, and important wildlife habitat.
    - Encourage tree planting: General Plan Policy NR-E-5 - The City will encourage the use of large-scale trees in new development to lessen heat build-up from solar radiation.
    - Open Space Preservation Growth Control Measures: Municipal Code Chapter 17.24 – limit the construction of new residential units within the incorporated boundaries of the City to an average of 30 units per year.
    - Open Space Preservation: Riparian Setbacks: Municipal Code Title 20 – Article III Chapter 20.24.085. Riparian setbacks have been established to protect rivers, creeks and streams from encroachment by urban uses and to protect riparian habitats.
    - Heritage Tree Protection: Municipal Code Title 20 – Article II Chapter 20.24.035. Protect certain trees in order to improve air quality, assist in abating soil and slope erosion and

preserve and enhance property values, thus promoting the public health, safety and welfare.

- General
    - Reduce GHG emissions: General Plan Policy NR-E-1 - The City will reduce GHG emissions produced communitywide.
    - Municipal GHG emissions: General Plan Policy NR-E-2 - The City will reduce GHG emissions produced by internal municipal operations.
    - Enforce state climate protection goals: General Plan Policy NR-E-6 - The City will comply with state climate protection goals and programs to the maximum extent allowed by the City's jurisdictional authority.

### 5.3.3 Greenhouse Gas Inventory and Forecast

**Figure 5.3-2. Healdsburg 2010 Community GHG Inventory by Source**



Healdsburg's inventory is similar to other cities in the county and the region. The majority of GHG emissions are from transportation due mostly to fossil fuel combustion in personal and light-duty vehicles. The next largest source is building energy, which includes emissions related to energy used to heat homes and businesses in Healdsburg. Residential uses account for most (52%) of the building energy emissions in Healdsburg. Commercial uses account for 44% of building energy emissions. Emissions resulting from energy consumed for industrial purposes are a small fraction (4%) of total energy use emissions in the community. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

Total GHG emissions generated by community activities in 2010 were 108,760 MTCO$_2$e, which is approximately 3% of countywide GHG emissions in the same year. This is a 16% increase from estimated 1990 emissions, which were 93,500 MTCO$_2$e. Table 5.3-3 shows the 1990 backcast, the 2010 inventory and business-as-usual (BAU) forecasts for 2015, 2020, 2040 and 2050 for the City of Healdsburg.

## Table 5.3-3. Healdsburg Community GHG Backcast, Inventory, and Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 21,310 | 23% | 33,670 | 31% | 33,890 | 29% | 34,150 | 28% | 34,690 | 28% | 34,950 | 29% |
| On-Road Transportation | 60,180 | 64% | 66,470 | 61% | 74,180 | 63% | 77,630 | 64% | 78,080 | 63% | 75,090 | 62% |
| Off-Road Transportation and Equipment | 1,570 | 2% | 1,570 | 1% | 1,810 | 2% | 2,100 | 2% | 3,640 | 3% | 3,680 | 3% |
| Solid Waste | 10,260 | 11% | 6,580 | 6% | 6,620 | 6% | 6,670 | 6% | 6,750 | 5% | 6,790 | 6% |
| Wastewater Treatment | 90 | 0% | 110 | 0.1% | 110 | 0% | 110 | 0% | 110 | 0% | 110 | 0% |
| Water Conveyance | 90 | 0% | 350 | 0.3% | 370 | 0% | 400 | 0% | 460 | 0% | 510 | 0% |
| **Total** | **93,500** | **100%** | **108,760** | **100%** | **116,970** | **100%** | **121,040** | **100%** | **123,730** | **100%** | **121,130** | **100%** |
| **Per-Capita Emissions** | **9.9** | | **9.7** | | **10.4** | | **10.6** | | **10.5** | | **10.1** | |

### 5.3.4 Greenhouse Gas Reduction Goal and Measures

The City of Healdsburg joins the other Sonoma County communities to support the regional GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 24 local GHG reduction measures. The City's GHG emissions under 2020 BAU (business as usual) conditions would be approximately 121,040 MTCO$_2$e (in absence of state, regional, and local reduction measures). The City's local GHG reduction measures, in combination with state and regional measures, would reduce the City's GHG emissions in 2020 to 87,180 MTCO$_2$e, which would be a reduction of approximately 27% compared to 2020 BAU conditions. The City will achieve these reductions through a combination of state (66%), regional (24%), and local (10%) measures that are technologically feasible and cost-effective per AB 32. Per-capita reductions in Healdsburg in 2020 would be 3.0 MTCO$_2$e per person. With the reduction measures in CA2020, per-capita emissions in Healdsburg will be 7.7 MTCO2e per person, a 22% reduction in per capita emissions compared to 1990.

**Table 5.3-4. Healdsburg 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

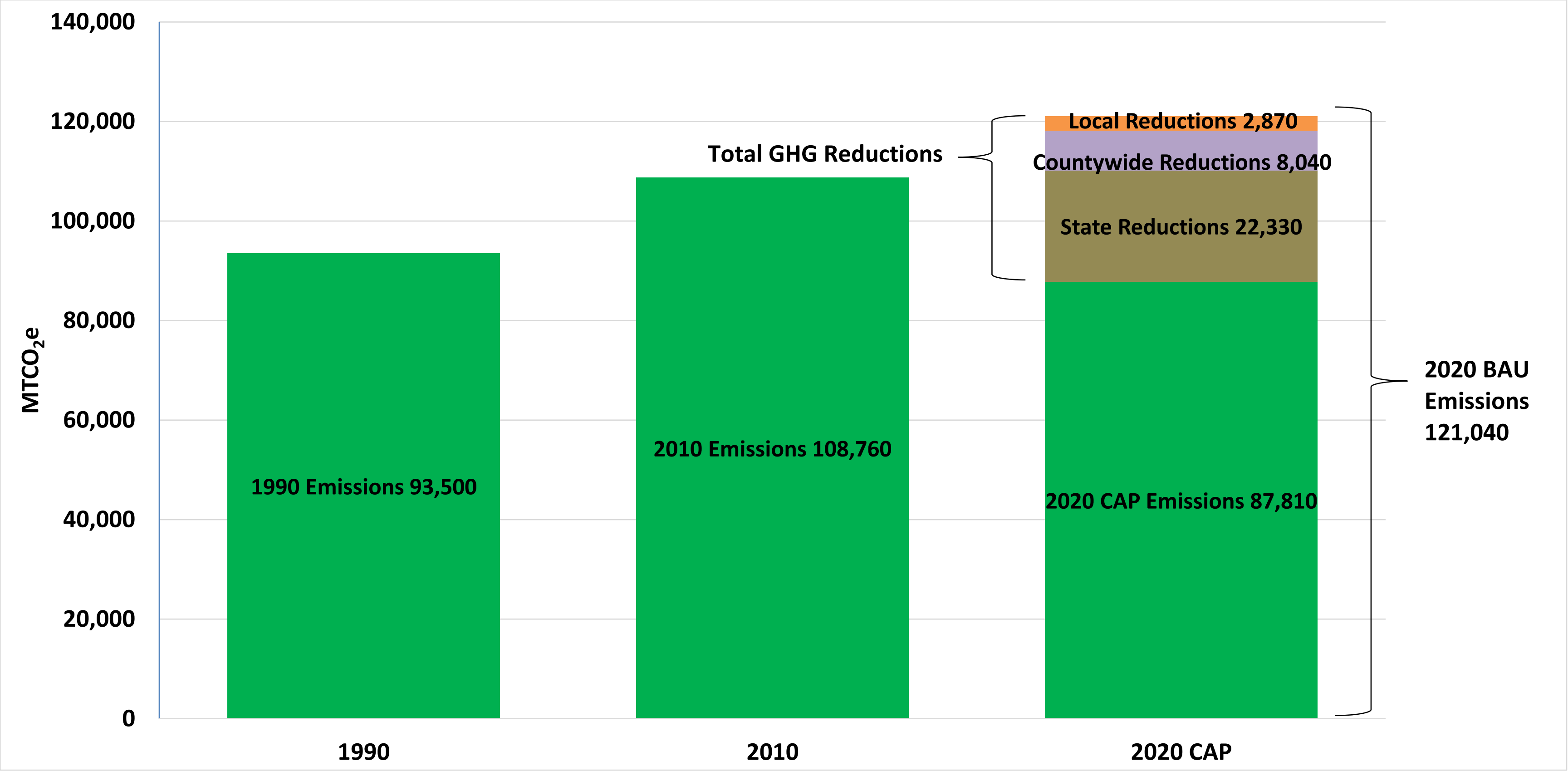
| | 2020 BAU | Reductions | | | | | |
|---|---|---|---|---|---|---|---|
| **Source** | **Projection** | **State** | **County-wide** | **Local** | **Total** | **2020 CAP Emissions** | **% Reduction from BAU** |
| Building Energy | 34,150 | 3,980 | 800 | 360 | 5,140 | 29,010 | 15% |
| On-Road Transportation | 77,630 | 18,160 | 2,080 | 1,220 | 21,470 | 56,160 | 28% |
| Off-Road Transportation and Equipment | 2,100 | 190 | - | 50 | 230 | 1,860 | 11% |
| Solid Waste | 6,670 | - | 5,000 | - | 5,000 | 1,670 | 75% |
| Water Conveyance | 400 | - | 80 | 1,240 | 1,320 | -[1] | 100% |
| Wastewater Treatment | 110 | - | 80 | - | 80 | 20 | 79% |
| **Total Emissions** | **121,040** | **22,330** | **8,040** | **2,870** | **33,230** | **87,810** | **27%** |
| | | **66%** | **24%** | **10%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.3-3 shows Healdsburg's 1990 and 2010 GHG emissions total, 2020 BAU emissions forecast total, and the total emissions remaining after implementation of the City's reduction measures. The contribution of state, regional, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emissions reductions achieved in 2020. Like the other communities, Healdsburg benefits greatly from the work the state and regional entities are committed to implementing on climate action. See Chapter 4 for more information on state and regional actions.

**Figure 5.3-3. Healdsburg 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions**



## Greenhouse Gas Reduction Measures

As shown in Table 5.3-5, the City of Healdsburg will achieve its reduction goal through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the City to comply with state mandates (e.g., Title 24 energy efficiency measures). State measure reductions total 22,330 MTCO$_2$e, which include the Pavley vehicle fuel efficiency standards, Title 24 building standards, the state's low carbon fuel standard, and the RPS.

**Green Water Production in the City of Healdsburg**

While SCWA has adopted a carbon free water goal, the City of Healdsburg, which is not served by SCWA, has taken its own steps to deliver water supplied by green energy. By 2020, the City expects that 100% of water deliveries will be from green, non emitting energy. The reductions from this action by the City are captured in Measure 11 R2.

Regional measures will reduce emissions by 8,040 MTCO$_2$e and will be implemented by regional entities, including the Regional Climate Protection Authority (RCPA), Sonoma County Water Agency (SCWA), County of Sonoma Energy Independence Office (ESD), Sonoma County Transportation Authority (SCTA), and Sonoma Clean Power (SCP).

An additional reduction of 2,870 MTCO$_2$e will be achieved through locally adopted measures. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent the actions that Healdsburg can take directly. The City of Healdsburg has local control over their infrastructure and policies and have selected the local measures that best suit the needs of their community.

The three measures that will have the greatest impact in Healdsburg are, in order of importance, Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009), Measure 5-L6 (Parking Policies), and Measure 14-L1 (Green Energy for Water Production & Wastewater Processing). These three measures, in addition to reducing GHG emissions, will conserve water and other natural resources and improve air quality and public health in the City. As the county and state continue to experience a historic drought, water conservation will remain an especially important co-benefit.

Emissions sources with the greatest percentage reduction are water conveyance and solid waste. While these sources achieve a large percentage reduction compared to their BAU emission levels, their CO$_2$e reduction in metric tons is relatively small compared to other sources, especially building energy and on-road transportation.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the City. Of the regional measures, the measures with the greatest impact are the waste-to-energy and waste diversion measures.

Table 5.3-5 presents the individual GHG reduction measures that Healdsburg has selected for the CAP. For more information on the specifics of each measure, see Appendix C.

## Table 5.3-5. Healdsburg 2020 GHG Emissions Reductions by Measure

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **State and Regional Measures** | | |
| **Goal 1: Increase Building Energy Efficiency** | **1,851** | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 93 | N/A |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 959 | N/A |
| Measure 1-S3: Industrial Boiler Efficiency | - | N/A |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 28 | N/A |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 770 | N/A |
| **Goal 2: Increase Renewable Energy Use** | **2,924** | |
| Measure 2-S1: Renewables Portfolio Standard | 2,894 | N/A |
| Measure 2-S2: Solar Water Heaters | 30 | N/A |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **1,567** | |
| Measure 5-R1: Improve and Increase Transit Service | < 1 | N/A |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A |
| Measure 5-R4: Trip Reduction Ordinance | 302 | N/A |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| Measure 5-R6: Reduced Transit Passes | 280 | N/A |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 224 | N/A |
| Measure 5-R8: Safe Routes to School | 761 | N/A |
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **18,164** | |
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 16,928 | N/A |
| Measure 6-S2: Advanced Clean Cars | 539 | N/A |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 697 | N/A |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **703** | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 186 | N/A |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 515 | N/A |
| Measure 7-R2: Alternative Fuel for Transit Vehicles | 2 | N/A |
| **Goal 9: Increase Solid Waste Diversion** | **1,973** | |
| Measure 9-R1: Waste Diversion Goal | 1,973 | N/A |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **3,025** | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 3,025 | N/A |
| **Goal 11: Reduce Water Consumption** | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | NQ |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 12: Increase Recycled Water and Greywater Use** | **47** | | |
| Measure 12-R1: Recycled Water* | 47 | N/A | |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **114** | | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 77 | N/A | |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 37 | N/A | |
| **Local Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **165** | | |
| Measure 1-L2: Outdoor Lighting | 163 | 80% | of outdoor lighting to participate |
| Measure 1-L3: Shade Tree Planting | 1 | 100 | trees planted |
| **Goal 2: Increase Renewable Energy Use** | **192** | | |
| Measure 2-L1: Solar in New Residential Development | 2 | 8% | of new houses to participate |
| Measure 2-L2: Solar in Existing Residential Building | 57 | 2% | of existing homes with solar |
| Measure 2-L3: Solar in New Non-Residential Developments | 1 | 2% | of new non-residential development to participate |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 133 | 2% | of existing non-residential development with solar |
| **Goal 3: Switch Equipment from Fossil Fuel to Electricity** | **5** | | |
| Measure 3-L1: Convert to Electric Water Heating | 5 | 1% | of households |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **89** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 71 | 20% | of growth to result in mixed use |
| Measure 4-L2: Increase Transit Accessibility | 17 | 20% | of growth to be 25+ units |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| Measure 4-L4: Affordable Housing Linked to Transit | 1 | 15% | of new development to be affordable |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **1,117** | | |
| Measure 5-L1: Local Transportation Demand Management Program | 112 | 20% | of employees eligible |
| Measure 5-L2: Carpool-Incentives & Ride-Sharing Program | 146 | 25% | of employees eligible |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 30 | 50% | of trips affected |
| Measure 5-L6: Parking Policies | 830 | 50% | of area affected |
| Measure 5-L7: Supporting Parking Policy Measures | NQ | Yes | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **58** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 11 | 20 | charging stations installed |
| Measure 7-L2: Electrify Construction Equipment | 47 | 10% | of equipment |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | NQ | Yes | |
| **Goal 8: Reduce Idling** | | | |
| Measure 8-L1: Idling Ordinance | NQ | 2 | Minutes below state law |
| **Goal 11: Reduce Water Consumption** | **1,054** | | |
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 1,054 | 20% | Reduction in per capita water use |
| **Goal 12: Increase Recycled Water and Greywater Use** | **< 1** | | |
| Measure 12-L1: Greywater Use | < 1 | 1% | greywater goal |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **Goal 14: Increase Use of Renewable Energy in Water and Wastewater Systems** | **185** | |
| Measure 14-L1: Green Energy for Water Production and Wastewater Processing in Healdsburg and Cloverdale* | 185 | Yes |
| **State Measure Reductions in Healdsburg** | **22,330** | |
| **Regional Measure Reductions in Healdsburg** | **8,040** | |
| **Local Measure Reductions in Healdsburg** | **2,870** | |
| **Grand Total Emissions Reductions in Healdsburg** | **33,230** | |

*Measures reduce emissions from multiple sources (i.e. water and energy)

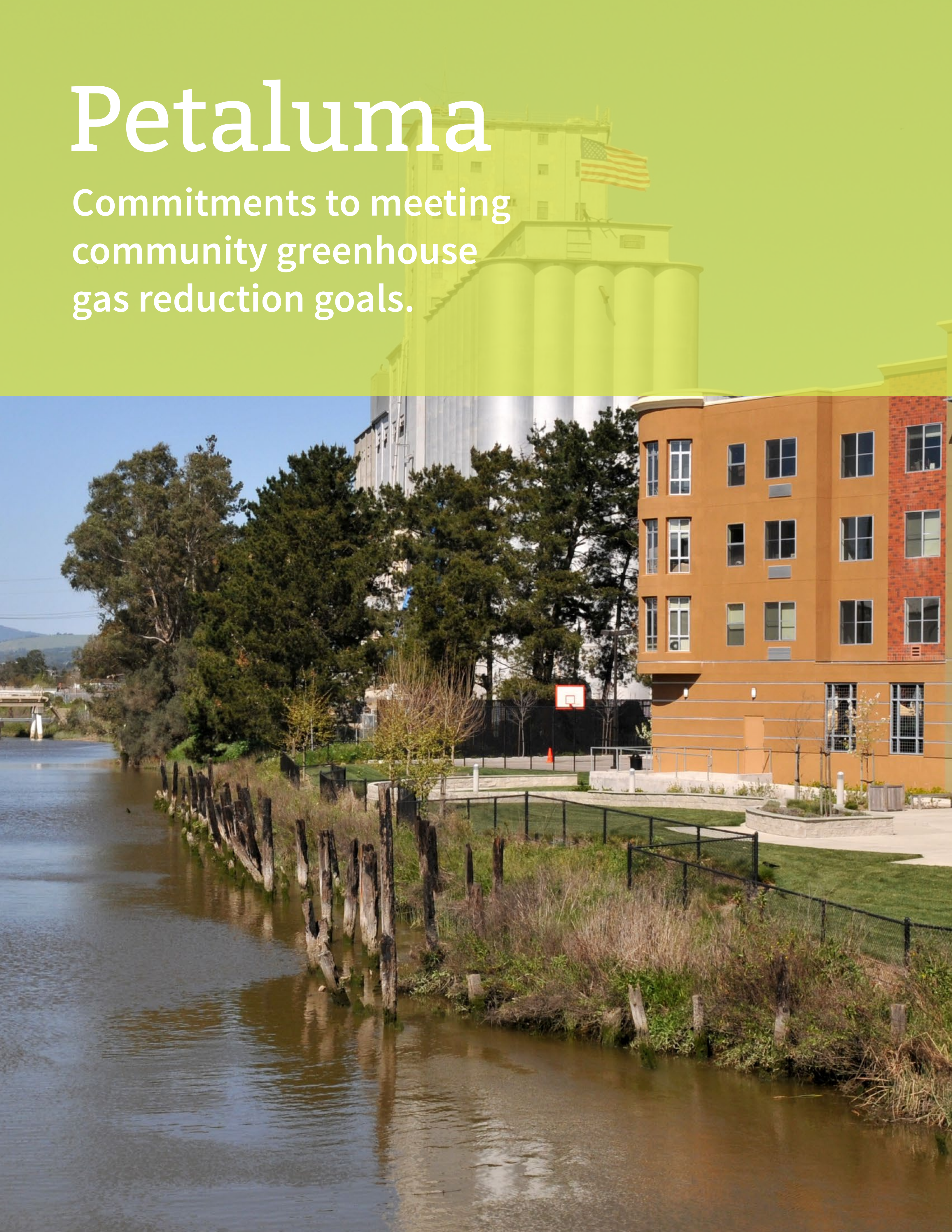
NQ = not quantified

### 5.3.5 Municipal Greenhouse Gas Reduction Measures

Like the other cities and the county, Healdsburg has recognized the need to reduce GHG emissions from municipal operations. The City has existing programs in place for green municipal buildings and alternative fuels for its municipal fleet. Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. Healdsburg and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# Petaluma

## Commitments to meeting community greenhouse gas reduction goals.



# 5.4 Petaluma

This section presents the community greenhouse gas (GHG) emissions profile specific to Petaluma and the measures that the City of Petaluma will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.4.1 Community Summary

Petaluma serves as the southern gateway to Sonoma County, located 3 miles north of the Marin County-Sonoma County border and less than 20 miles south of Santa Rosa. Petaluma is known for its thriving historic downtown district, rich agricultural heritage, and as a growing hub for food and beverage processing, information communications technology, green services and construction, diversified manufacturing, consumer products, health & wellness, tourism, and recreation. Home to a diverse range of housing types, award-winning schools, and over 40 annual events and festivals, Petaluma is a family-oriented community with a strong sense of place with easy access to wine country, the coast, and San Francisco.

### Demographics

Petaluma spans 14.5 square miles and had a population of 57,941 as of the 2010 census. In 2020 the population of Petaluma is expected to be 61,122, an increase of 5% over 2010. Employment in the area is expected to increase by 13%. Petaluma's demographic composition in 2010 was 81% White, 1% African American, 0.6% Native American, 5% Asian, 0.2% Pacific Islander, 9% from other races, and 4% from two or more races. Persons of Hispanic or Latino origin were 22%.

As shown in Table 5.4-1, the City is expected to experience steady growth in population, housing, and jobs in the future.

**Table 5.4-1. Petaluma Socioeconomic Data**

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | **1990** | **2010** | **2015** | **2020** | **2040** | **2050** |
| Population | 43,184 | 57,941 | 59,440 | 61,122 | 68,542 | 71,980 |
| Housing | 16,062 | 22,198 | 22,862 | 23,508 | 26,362 | 27,670 |
| Employment | 26,145 | 31,537 | 33,644 | 35,738 | 38,488 | 39,897 |

Socioeconomic data were derived from the SCTA travel demand model and incorporate input from the City based on its internal planning forecasts.

According to the 2010 Census data, Petaluma housing is majority owner-occupied with 65% of all housing units owned and 35% rented.

## Energy and Water Use

Compared to households in the county as a whole, Petaluma households use less electricity and water but more natural gas. They also use less electricity, natural gas, and water than households statewide.

**Table 5.4-2. Petaluma, County, and State 2010 Average Energy and Water Use (per household, per year)**

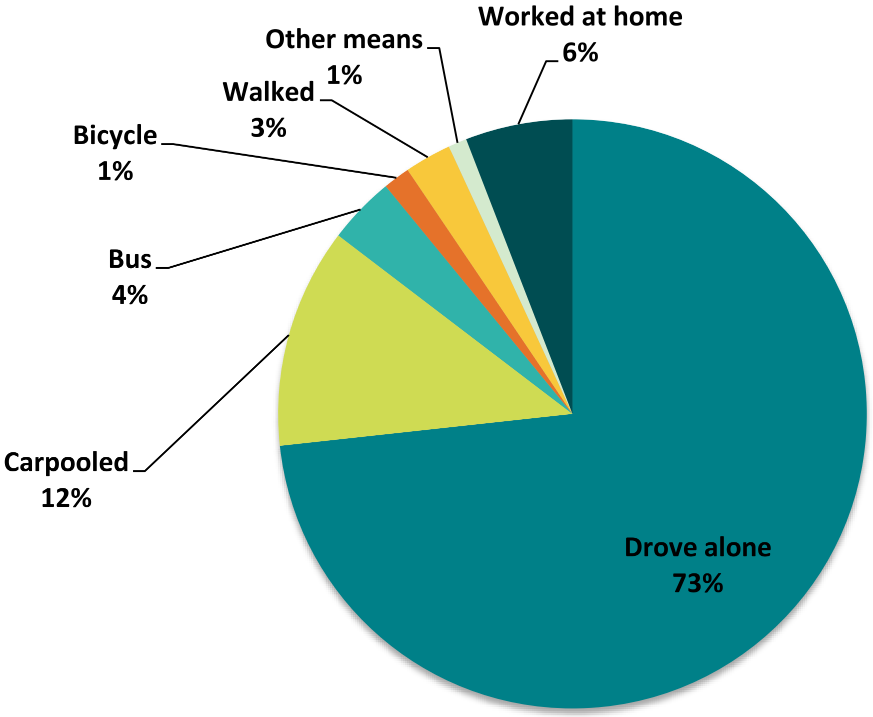
| | Petaluma | County | State |
|---|---|---|---|
| Electricity (kWh) | 6,000 | 7,042 | 9,320 |
| Natural Gas (Therms) | 493 | 413 | 512 |
| Water Use (Gallons) | 73,268 | 75,810 | 107,869 |

Sources:
City Data: provided by PG&E (energy) and by the City of Petaluma Urban Water Management Plan.
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In the inventory year 2010, most Petaluma residents (73%) drove alone to work. The average work trip for a resident of Petaluma is 29.3 minutes, higher than the county average of 25.3 minutes (U.S. Census Bureau 2014).

**Figure 5.4-1. Modes to Work in Petaluma in 2010**



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

## 5.4.2 Petaluma's Existing Actions to Reduce GHG Emissions

Petaluma has already taken a number of steps to reduce energy use, promote renewable energy use, and other actions that have already been helping to reduce GHG emissions. The City has adopted the following programs, ordinances, and General Plan policies that help to reduce GHG emissions and will support the implementation of the formal GHG reduction measures in this CAP.

- Building Energy
    - Residential Retrofits: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
    - Residential Appliance Upgrades: Programs through PG&E and other agencies.
    - Solar Installations at Residences: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
    - Solar Sonoma County program.
    - Community Choice Aggregation – General Plan Policy: Chapter 4 – Policy 4-P-28. Prepare a feasibility report for the City of Petaluma forming a Community Choice Aggregation as a way of supplying renewable energy to the community. (Petaluma joined SCP in 2014).
    - Solar Subsidy – General Plan Policy: Chapter 4 – Policy 4-P-32. Investigate the feasibility of developing a City sponsored program to subsidize or assist homeowners in purchasing

solar water heating or passive solar systems, or other forms of renewable energy, through low-interest loans or property tax assessments. (Petaluma participates in the Sonoma County Energy Independence Program and Property Assessed Clean Energy [PACE] Financing Marketplace).

  - Green Building Guidelines – General Plan Policy: Chapter 2 – Policy 2-P-118B. Prepare and adopt green street standards, and incorporate these practices in design of City streets.
  - Green Building Guidelines – General Plan Policy: Chapter 2 – Policy 2-P-118C. Prepare a salvage ordinance that requires an inventory of usable materials prior to demolition.
  - Incorporation – General Plan Policy: Chapter 2 – Policy 2-P-119. Incorporate green building principles and practices into the planning, design, construction, management, renovation, operations, and demolition of all facilities that are constructed, owned, managed or financed by the City.
  - Evaluation and Implementation – General Plan Policy: Chapter 2 – Policy 2-P-121. Evaluate the success of the voluntary green program and develop and implement a mandatory program for new residential, commercial and municipal development and remodels.
  - CALGreen Building Standards Code: Municipal Code Chapter 17.04.010 – Part 11. CALGreen Tier 1 adopted as mandatory for residential and non-residential buildings.
  - Energy Standards – General Plan Policy: Chapter 4 – Policy 4-P-18. Develop and adopt local energy standards that would result in less energy consumption than standards set by the California Energy Commission’s (CEC) Title 24 or updates thereto.
- Land Use and Transportation
  - Bicycle and Pedestrian Master Plan adopted May 2008.
  - Multiple Modes – General plan Policy: Chapter 5 – Policy 5-P-1. Develop an interconnected mobility system that allows travel on multiple routes by multiple modes.
  - Increased Transit Service – General Plan Policy: Chapter 5 – Policy 5-G-42. Expand the bus transit system so that it is convenient and provides frequent, regular service along major City corridors serving education, shopping, and employment destinations, and SMART park-and-ride lots.
  - Subsidized Fares – General Plan Policy: Chapter 5 – Policy 5-P-44. Maintain a transit system of nominal cost, or no cost, to riders.
  - Support Transit Oriented Development – General Plan Policy: Chapter 5 – Policy 5-P-43. Support efforts for transit oriented development around the Petaluma Depot and along the Washington Street, Petaluma Boulevard, McDowell Boulevard, Lakeville Street, and other transit corridors. (Petaluma SMART Rail Station Areas: TOD Master Plan adopted June 2013)

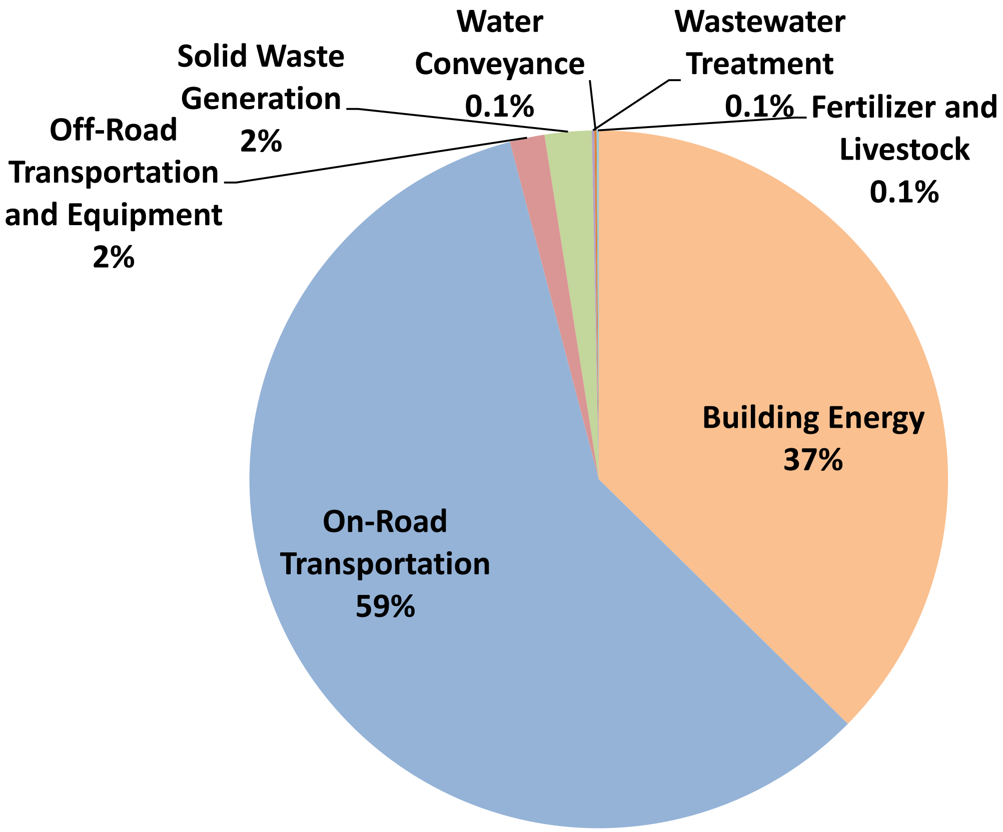
  - Transportation Demand Management – General Plan Policy: Chapter 5 – Policy 5-P-13. Encourage existing major employers to develop and implement Transportation Demand Management programs to reduce peak period trip generation.
  - Alternative Fuel Stations – General Plan Policy: Chapter 4 – Policy 4-P-9. Require a percentage of parking spaces in large parking lots or garages to provide electrical vehicle charging facilities.
  - Charging Stations – General Plan Policy: Chapter 4 – Policy 4-P-10. Require electric vehicle charging and alternative fuel facilities at all new and remodeled gas stations.
  - Ride Sharing – General Plan Policy: Chapter 4 -Policy 4-P-11. Promote ride-sharing and car-sharing programs.
  - Drive-Through Prohibition – General Plan Policy: Chapter 4 – Policy 4-P-12. Prohibit new drive-thru food and service facilities with the exception of vehicle serving businesses, such as car wash and oil/lube, and limit expansion of the drive-thru components of existing facilities which increase idling vehicles.
  - Traffic Calming – General Plan Policy: Chapter 4 – Policy 4-P-13. Require development of traffic roundabouts, where feasible, as an alternative to a traffic signal, to reduce idling vehicles.
  - Transportation Tech – General Plan Policy: Chapter 4 – Policy 4-P-14. Develop and integrate Intelligent Transportation Technologies, as applicable, into Petaluma's transportation system.
  - Trip Reduction Ordinance: Municipal Code Chapter 11.90. Requirements for employers with 100+ employees at a given work site to distribute information on the benefits of alternative transportation, designate a transportation coordinator, and perform annual surveys and reports on employee transportation use.
- Waste Minimization and Recycling
  - Construction Phase Recycling Plan – General Plan Policy: Chapter 2 – Policy 2-P-121. Require development projects to prepare a Construction Phase Recycling Plan that would address the reuse and recycling of major waste materials (soil, vegetation, concrete, lumber, metal scraps, cardboard packaging, etc.) generated by any demolition activities and construction of the project.
  - Plastic Bottles – General Plan Policy: Chapter 4 – Policy 4-P-21G. Investigate and replace bottled water in City offices with alternate source of drinking water.
  - Compost – General Plan Policy: Chapter 4 – Policy 4-P-21D. Develop a residential and commercial food waste composting program.
  - Environmental Purchasing – General Plan Policy: Chapter 4 – Policy 4-P-32. Develop and implement a municipal Environmentally Preferable Purchasing Program.

  - Green Purchasing – General Plan Policy: Chapter 4 – Policy 4-p-21D. Purchase goods containing recycled materials for City use.
- Urban Forestry and Natural Areas
  - Required Tree Planting – General Plan Policy: Chapter 4 – Policy 4-P-6A. Require planting of trees for every significant tree removed at a project site. Replacement planting may occur on the project site or on a publicly owned area, with long-term maintenance assured. Encourage the use of trees which provide biogenic benefits to air quality and are suitable to the local environment.
- Water and Wastewater Efficiency
  - Petaluma's water treatment facility currently supplies 846 acre feet per year of recycled water for outdoor turf irrigation. This is projected to increase to over 1,100 acre feet per year by 2020.
  - Sewer Lateral Replacement Grant Program: provides financial assistance to property owners for the replacement of their private sewer lateral, which is often a source of infiltration and inflow to the sewer collection system.
  - High Efficiency Toilet Rebate: Up to $150 rebate for each high-efficiency toilet installed.
  - High Efficiency Clothes Washer Rebate: Up to $125.00 rebates for high efficiency clothes washing machines.
  - Mulch Madness: Offers free mulch, compost, cardboard, an irrigation conversion kit and free native plants from a local native plant nursery to those customers who wish to sheet mulch their existing turf. Free volunteer labor for those that are unable to install measures themselves.
  - Smart Yard: improves landscape water use efficiency by assessing and installing water-use efficiency irrigation and landscape systems. The cost of the systems and labor is added to a monthly water bill. The charges are added to the water bill for 5 years, after which the customer officially owns the system.
- Multi-sector
  - The City of Petaluma's Biomass-to-Biofuel Project will leverage highly optimized anaerobic digestion technology and state-of-the-art biogas scrubbing technology to produce more than 150,000 gallons gas equivalent of compressed natural gas (CNG) annually. The biogas will be produced primarily from high strength waste, food waste and fats, oils and grease, and wastewater solids. This renewable fuel will replace high carbon intensity fuels with CNG that has a net negative carbon intensity for Petaluma's transit fleet and its waste hauler's collection fleet. This project could serve as a model for a local renewable fuel program. The project combines several features for reducing carbon emissions:

    - Efficiently producing and utilizing a very low carbon intensity, renewable vehicle fuel as a replacement for high carbon intensity fuels, like diesel.
    - Substantially reducing truck traffic and fuel consumption by keeping and treating commercial food waste, FOG and food processing waste within the community
    - Discontinuing the disposal of readily biodegradable waste in situations and landfills where aggressive greenhouse gases are produced and difficult to contain.
- Greenhouse Gas Emissions
  - General Plan Policy: Chapter 4 – Policy 4-P-15. Improve air quality by reducing emissions from stationary point sources of air pollution (e.g., equipment at commercial and industrial facilities) and stationary area sources (e.g., wood-burning fireplaces & gas powered lawn mowers) which cumulatively emit large quantities of emissions.
  - Climate Action Plan – General Plan Policy: Chapter 4 – Policy 4-P-27. The City shall prepare a Community Climate Action Plan to identify and prioritize programs, projects, and procedural policies that will help the City achieve the community greenhouse gas emission goals of Resolution 2005-118 (25% below 1990 levels by 2015).

### 5.4.3 Greenhouse Gas Inventory and Forecast

**Figure 5.4-2. Petaluma 2010 Community GHG Inventory by Source**



Petaluma's inventory is similar to other cities in the county and state. The majority of the GHG emissions are from transportation due to fossil fuel combustion in personal and light-duty vehicles. The next largest source is building energy, which includes emissions related to energy used to heat the homes and businesses in Petaluma. Residential uses account for most (54%) of the building energy emissions in Petaluma. Commercial uses account for 46% of building energy emissions. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

In Petaluma, total GHG emissions generated by community activities in 2010 were 441,880 $MTCO_2e$, which is approximately 12% of countywide GHG emissions in the same year. This is a 14% increase from estimated 1990 emissions, which were 387,020 $MTCO_2e$. Table 5.4-3 shows the 1990 backcast, the 2010 inventory and business-as-usual (BAU) forecasts for 2015, 2020, 2040 and 2050 for the City of Petaluma.

## Table 5.4-3. Petaluma Community GHG Backcast, Inventory, and Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 134,720 | 35% | 165,260 | 37% | 182,020 | 36% | 190,180 | 35% | 209,020 | 36% | 218,060 | 37% |
| On-Road Transportation | 228,530 | 59% | 258,940 | 59% | 303,090 | 60% | 330,670 | 61% | 339,440 | 58% | 336,690 | 57% |
| Off-Road Transportation and Equipment | 5,980 | 2% | 7,110 | 2% | 8,550 | 2% | 10,290 | 2% | 19,370 | 3% | 20,210 | 3% |
| Solid Waste | 11,960 | 3% | 9,580 | 2% | 10,050 | 2% | 10,530 | 2% | 11,530 | 2% | 12,020 | 2% |
| Wastewater Treatment | 390 | 0% | 520 | 0.1% | 540 | 0% | 550 | 0% | 620 | 0% | 650 | 0% |
| Water Conveyance | 5,440 | 1% | 470 | 0.1% | 720 | 0% | 750 | 0% | 880 | 0% | 930 | 0% |
| **Total** | **387,020** | **100%** | 441,880 | **100%** | 504,970 | **100%** | 542,970 | **100%** | 580,870 | **100%** | 588,560 | **100%** |
| **Per-Capita Emissions** | **9.0** | | **7.6** | | **8.5** | | **8.9** | | **8.5** | | **8.2** | |

### 5.4.4 Greenhouse Gas Reduction Goal and Measures

The City of Petaluma joins the other Sonoma County communities to support the regional GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 24 local GHG reduction measures. The City's GHG emissions under 2020 BAU conditions (in absence of state, regional, and local measures) would be approximately 542,970 $MTCO_2e$. The City's local GHG reduction measures, in combination with state and regional measures, would reduce the City's GHG emissions in 2020 to 376,630 $MTCO_2e$, which would be a reduction of approximately 31% compared to 2020 BAU conditions. The City will achieve these reductions through reduction measures that are technologically feasible and cost-effective per AB 32 through a combination of state (72%), regional (17%), and local (11%) efforts. With the reduction measures in CA2020, per-capita emissions in Petaluma will be 6.2 MTCO2e per person, a 31% reduction in per capita emissions compared to 1990.

**Table 5.4-4. Petaluma 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

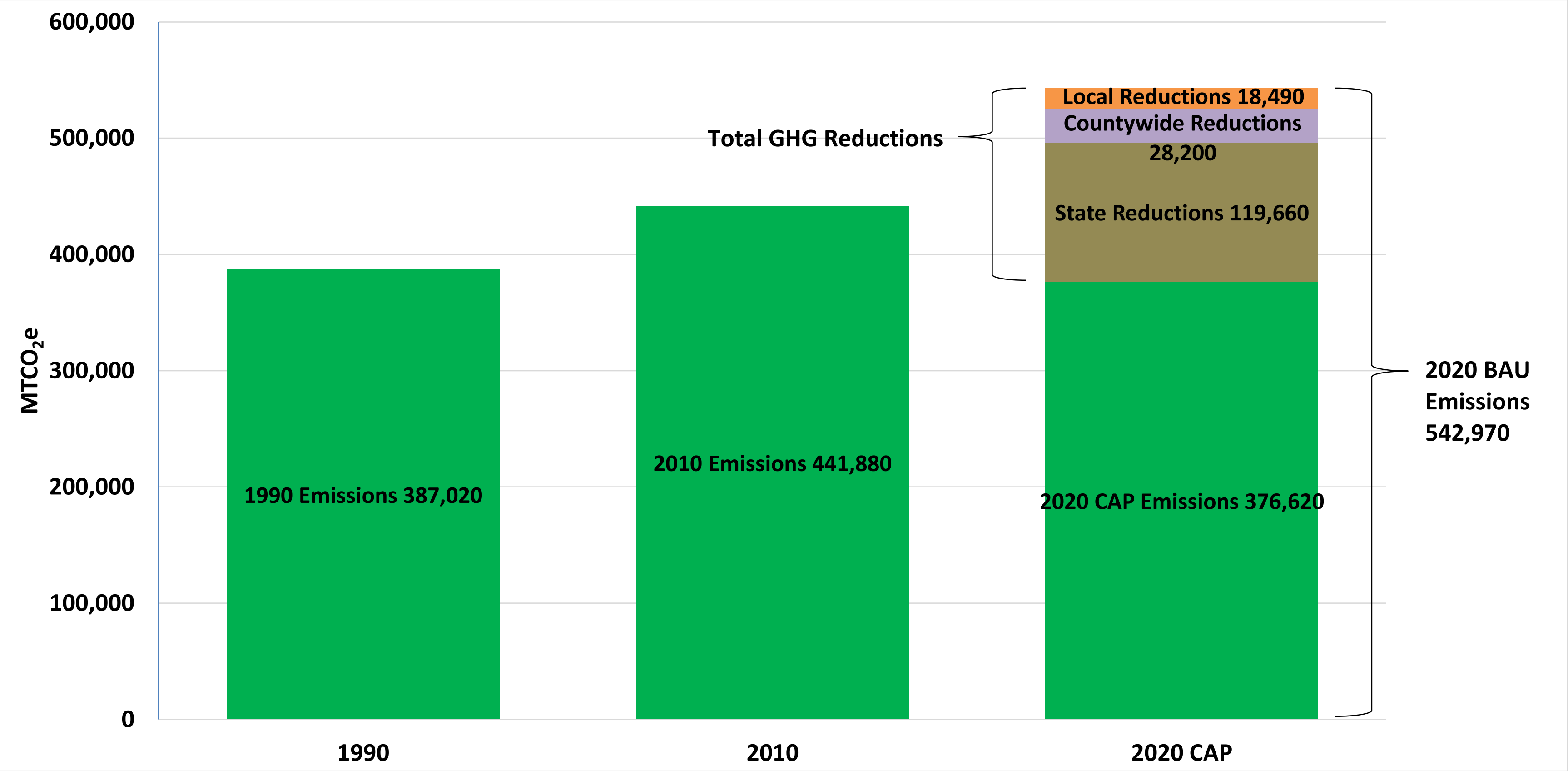
| Source | 2020 BAU Forecast | Reductions | | | | 2020 CAP Emissions | % Reduction from BAU |
|---|---|---|---|---|---|---|---|
| | | State | County-wide | Local | Total | | |
| Building Energy | 190,180 | 43,440 | 11,900 | 9,160 | 64,500 | 125,680 | 34% |
| On-Road Transportation | 330,670 | 75,300 | 8,540 | 1,640 | 85,470 | 245,200 | 26% |
| Off-Road Transportation and Equipment | 10,290 | 910 | - | 2,670 | 3,580 | 6,710 | 35% |
| Solid Waste | 10,530 | - | 6,950 | - | 6,950 | 3,590 | 66% |
| Water Conveyance | 750 | - | 680 | 5,020 | 5,710 | - [1] | 100% |
| Wastewater Treatment | 550 | - | 140 | - | 140 | 420 | 25% |
| **Total Emissions** | **542,970** | **119,660** | **28,200** | **18,490** | **166,350** | **376,630** | **31%** |
| | | **72%** | **17%** | **11%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures reduce improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.4-3 shows Petaluma's 1990 and 2010 GHG emissions total, 2020 BAU emissions forecast total, and the total emissions remaining after implementation of the City's reduction measures. The contribution of state, regional, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emissions reductions achieved in 2020. Like the other communities, Petaluma benefits greatly from the work the state and other regional entities are committed to implementing on climate action. See Chapter 4 for more information on state and regional actions.

**Figure 5.4-3. Petaluma 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions**



## Greenhouse Gas Reduction Measures by Source

As shown in Table 5.4-5, the City of Petaluma will achieve its reduction goal through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the City to comply with state mandates (e.g., Title 24 energy efficiency measures). State measure reductions total 119,660 $MTCO_2e$, including the Pavley vehicle fuel efficiency standards, Title 24 building standards, the state's low carbon fuel standard, and the RPS.

Regional measures will reduce emissions by 28,200 $MTCO_2e$ and will be implemented by regional entities, including the Regional Climate Protection Authority (RCPA), Sonoma County Water Agency (SCWA), County of Sonoma Energy Independence Office (ESD), Sonoma County Transportation Authority (SCTA), and Sonoma Clean Power (SCP).

An additional reduction of 18,490 $MTCO_2e$ will be achieved primarily through locally adopted measures relevant to the City of Petaluma. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent the actions that local communities can take directly. The communities have local control over their infrastructure and policies and have selected the local measures that best suit the needs of their community.

The three measures that will have the greatest impact in Petaluma are, in order of importance, Measure 2-L4 (Solar in Existing Non-Residential Buildings), Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009), and Measure 7-L3 (Reduce Fossil fuel Use in Equipment). These three measures, in addition to reducing GHG emissions, will save energy, improve air quality and public health in the region, and conserve water and other natural resources. As the county and state continue to experience a historic drought, water conservation will remain an especially important co-benefit.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the City. Of the regional measures, the measures with the greatest impact include the Community Choice Aggregation (CCA) measure, the waste-to-energy measure, and the waste diversion measure.

Table 5.4-5 presents the individual GHG reduction measures that Petaluma has selected for the CAP. For more information on the specifics of the measures, see Appendix C.

**City of Petaluma Biomass to Biofuel Project**

The City of Petaluma is partnering with the California Energy Commission in a pilot project to capture the gas released naturally by food waste generated in the City and reuse it for fuel for the City's municipal vehicle fleet. The Biomass to Biofuel project will use state of the art technology to capture the gas from food waste and wastewater solids. The gas will then be used for the City's transit fleet and the waste collection vehicle fleet. The project will be an excellent example of how wastewater utilities and the food processing industry can reduce the carbon intensity of transportation.

## Table 5.4-5. Petaluma 2020 GHG Emissions Reductions by Measure

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **State and Regional Measures** | | |
| **Goal 1: Increase Building Energy Efficiency** | **9,236** | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 2,686 | N/A |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 4,135 | N/A |
| Measure 1-S3: Industrial Boiler Efficiency | - | N/A |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 155 | N/A |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 2,259 | N/A |
| **Goal 2: Increase Renewable Energy Use** | **46,104** | |
| Measure 2-S1: Renewables Portfolio Standard | 36,470 | N/A |
| Measure 2-S2: Solar Water Heaters | 153 | N/A |
| Measure 2-R1: Community Choice Aggregation | 9,481 | N/A |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **6,161** | |
| Measure 5-R1: Improve and Increase Transit Service | 49 | N/A |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A |
| Measure 5-R4: Trip Reduction Ordinance | 1,294 | N/A |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A |
| Measure 5-R6: Reduced Transit Passes | 1,198 | N/A |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 959 | N/A |
| Measure 5-R8: Safe Routes to School | 2,662 | N/A |
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **75,303** | |
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 70,043 | N/A |
| Measure 6-S2: Advanced Clean Cars | 2,140 | N/A |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 3,119 | N/A |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **3,286** | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 911 | N/A |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 2,338 | N/A |
| Measure 7-R2: Alternative Fuel for Transit Vehicles | 38 | N/A |
| **Goal 9: Increase Solid Waste Diversion** | **3,106** | |
| Measure 9-R1: Waste Diversion Goal | 3,106 | N/A |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **3,841** | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 3,841 | N/A |
| **Goal 11: Reduce Water Consumption** | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | N/A |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **141** | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 6 | N/A |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 136 | N/A |
| **Goal 14: Increase Use of Renewable Energy in Water and Wastewater Systems** | **678** | |
| Measure 14-R1: Sonoma County Water Agency Carbon Free Water by 2015 | 678 | N/A |
| **Local Measures** | | |
| **Goal 1: Increase Building Energy Efficiency** | **414** | |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 1-L2: Outdoor Lighting | 403 | 50% | of outdoor lighting to participate |
| Measure 1-L3: Shade Tree Planting | 11 | 1,000 | trees planted |
| **Goal 2: Increase Renewable Energy Use** | **8,407** | | |
| Measure 2-L1: Solar in New Residential Development | 106 | 50% | of new houses to participate |
| Measure 2-L2: Solar in Existing Residential Building | 1,889 | 15% | of existing homes with solar |
| Measure 2-L3: Solar in New Non-Residential Developments | 97 | 10% | of new non-residential development to participate |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 6,315 | 20% | of existing non-residential development with solar |
| **Goal 3: Switch Equipment from Fossil Fuel to Electricity** | **340** | | |
| Measure 3-L1: Convert to Electric Water Heating | 340 | 10% | of households |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **1,378** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 1,201 | 60% | of growth to result in mixed use |
| Measure 4-L2: Increase Transit Accessibility | 130 | 15% | of growth to be 25+ units |
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| Measure 4-L4: Affordable Housing Linked to Transit | 47 | 15% | of new development to be affordable |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **255** | | |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 255 | 100% | of trips affected |
| Measure 5-L7: Supporting Parking Policy Measures | NQ | Yes | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **2,619** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 3 | 5 | charging stations installed |
| Measure 7-L2: Electrify Construction Equipment | 224 | 10% | of equipment |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | 2,392 | Yes | |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 8: Reduce Idling** | **53** | | |
| Measure 8-L1: Idling Ordinance | NQ | 2 | minutes below state law |
| Measure 8-L2: Idling Ordinance for Construction Equipment | 53 | 2 | minutes below state law |
| **Goal 9: Increase Solid Waste Diversion** | **< 1** | | |
| Measure 9-L1: Create Construction and Demolition Reuse and Recycling Ordinance | < 1 | 3% | beyond baseline |
| **Goal 11: Reduce Water Consumption** | **5,024** | | |
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 3,755 | 20% | Reduction in per capita water use |
| Measure 11-L2: Water Conservation for New Construction* | 130 | 100% /50% | % of new residential/ nonresidential development |
| Measure 11-L3: Water Conservation for Existing Buildings* | 1,139 | 25%/ 50% | % of new residential/ nonresidential development |
| **Goal 12: Increase Recycled Water and Greywater Use** | **< 1** | | |
| Measure 12-L1: Greywater Use | < 1 | 2% | greywater goal |
| **State Measure Reductions in Petaluma** | **119,660** | | |
| **Regional Measure Reductions in Petaluma** | **28,200** | | |
| **Local Measure Reductions in Petaluma** | **18,490** | | |
| **Grand Total Emissions Reductions in Petaluma** | **166,350** | | |

*Measures reduce emissions from multiple sources (i.e. water and energy)

NQ = not quantified

### 5.4.5 Municipal Greenhouse Gas Reduction Measures

Like the other cities and the county, Petaluma has recognized the need to reduce GHG emissions from municipal operations. Petaluma completed the “City of Petaluma Greenhouse Gas Emissions Reduction Action Plan Analysis” in October 2009. This municipal climate action plan outlines GHG reduction initiatives that the City can pursue for its facilities. The analysis and resulting GHG emissions reductions include opportunities for improved municipal building efficiency, fleet composition, street light retrofits, water/wastewater system improvements, and PV system installations.

Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. Petaluma and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# Rohnert Park

## Commitments to meeting community greenhouse gas reduction goals.

# 5.5 Rohnert Park

This section presents the community greenhouse gas (GHG) emissions profile specific to Rohnert Park and the measures that the City of Rohnert Park will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.5.1 Community Summary

Rohnert Park is located approximately 50 miles north of San Francisco and is bordered by the cities of Cotati to the southwest and Santa Rosa to the north. By automobile, Rohnert Park is accessed regionally from U.S. 101 and State Route (SR) 116. U.S. 101 travels north-south through Rohnert Park, connecting the City to Mendocino County on the north and the San Francisco Bay Area to the south. SR 116 is connected to U.S. 101 and to cities and destinations including Sebastopol, the Sonoma Coast, and the Russian River to the west; Petaluma to the south; and the Sonoma Valley to the east.

Modeled on the neighborhood unit concept, Rohnert Park was established in 1956 as a master-planned city. The neighborhood unit concept emphasized the development of cities as a series of neighborhood units, with single-family residences organized around a centrally located school and park. Commercial areas were planned at the periphery of each neighborhood unit.

Rohnert Park has a designated stop on the SMART commuter rail line, which is expected to start service in late 2016. The SMART line will connect the major cities of Sonoma and Marin Counties along U.S. 101, from Cloverdale to the Larkspur Ferry Terminal. Rohnert Park is located approximately midway on the planned SMART rail system and is one of 10 SMART stations planned in Sonoma County, which also include neighboring Cotati, Santa Rosa, and Petaluma. In 2013, the City received the Priority Development Area (PDA) planning grant from the Metropolitan Transportation Commission to prepare a PDA Plan to leverage the coming SMART station and Multi-Use Path (MUP) to support creation of a transit-oriented, pedestrian-friendly downtown for Rohnert Park. The PDA Plan also promotes infill growth supporting development of Central Rohnert Park as a complete community, with a mix of uses and greater range of transit, bicycle, and pedestrian circulation options.

Both the SMART commuter train and the MUP are intended to provide alternative forms of transportation, potentially reducing vehicular congestion on U.S. 101 and related GHG emissions.

### Demographics

Rohnert Park spans 7 square miles and had a population of 40,971 as of the 2010 census. In 2020 the population of Rohnert Park is expected to be 47,232, an increase of 15% over 2010. Employment in the area is expected to increase by 43%. Rohnert Park's demographic composition in 2010 was 76% White, 2% African American, 1% Native American, 5% Asian, 0.4% Pacific Islander, 10% from other races, and 6% from two or more races. Persons of Hispanic or Latino origin were 22%.

As shown in Table 5.5-1, growth in population, housing, and jobs in the City is expected to occur moderately over the planning period.

**Table 5.5-1. Rohnert Park Socioeconomic Data**

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | **1990** | **2010** | **2015** | **2020** | **2040** | **2050** |
| Population | 36,326 | 40,971 | 42,590 | 47,232 | 50,804 | 54,581 |
| Housing | 13,404 | 16,143 | 16,941 | 18,787 | 20,208 | 21,710 |
| Employment | 15,288 | 15,038 | 17,393 | 21,460 | 21,460 | 21,460 |

Socioeconomic data were derived from the SCTA travel demand model and incorporate input from the City based on its internal planning forecasts.

According to the 2010 Census data, the City of Rohnert Park is majority owner-occupied with 54% of housing units owned and 46% rented.

### Energy and Water Use

Compared to households in the county as a whole, Rohnert Park households use less electricity, natural gas, and water. They also use less electricity, natural gas, and water than households statewide.

**Table 5.5-2. Rohnert Park, County, and State 2010 Average Energy and Water Use (per household, per year)**

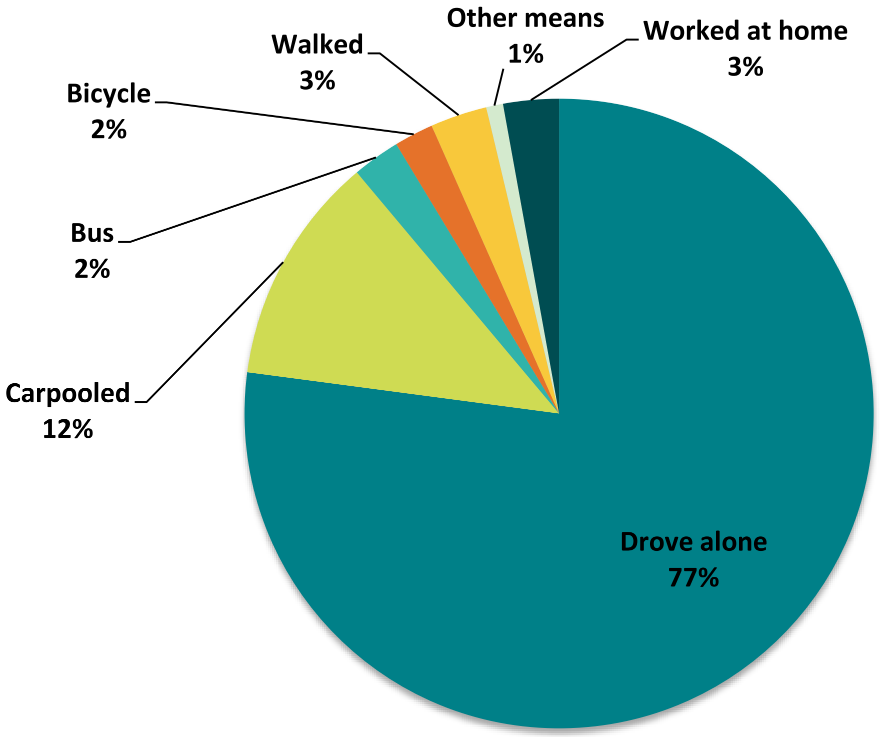
| | Rohnert Park | County | State |
|---|---|---|---|
| Electricity (kWh) | 6,039 | 7,042 | 9,320 |
| Natural Gas (Therms) | 392 | 413 | 512 |
| Water Use (Gallons) | 62,733 | 75,810 | 107,869 |

Sources:
City Data: provided by PG&E (energy) and by the City of Rohnert Park Urban Water Management Plan.
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

### Transportation Commute Modes

In inventory year 2010, most Rohnert Park residents (77%) drove to work, with 12% carpooling. According to Census data, it takes residents of Rohnert Park an average of 27.7 minutes to get to work (U.S. Census Bureau 2014).

**Figure 5.5-1. Modes to Work in Rohnert Park in 2010**



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

## 5.5.2 Rohnert Park's Existing Actions to Reduce GHG Emissions

Rohnert Park has already taken a number of steps to reduce energy use, promote renewable energy use, and other actions that have been helping to reduce GHG emissions. The City has adopted the following ordinances and General Plan policies that help to reduce GHG emissions and will support the implementation of the formal GHG reduction measures in this CAP.

- Building Energy
  - Green Building Ordinance: Municipal Code Chapter 15.16.020. Adoption of CALGreen Tier 1 residential and non-residential voluntary measures as mandatory.
  - Residential Retrofits: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
  - Residential Appliance Upgrades: Programs through PG&E and other agencies.
  - Solar Installations at Residences: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
  - Solar Sonoma County program.
  - Climate Action Projects Completed for energy efficiency:
    - Lighting Retrofit (2001)

    - APS Measures (2006)
    - PV APS Package (2006)
    - Computer Network Controls (2009)
    - PV-New City Hall (2009)
    - LED Christmas Light Replacement (2009)
    - Staff Energy Efficiency Coordinator (2010)
    - HPS to LED A – Park Lights Project (2010)
    - Countywide Building Retrofit Program (2011)
  - Energy Efficiency Conservation Block Grant Program: Develop, promote, implement, and manage energy efficiency and conservation programs.
- Land Use and Transportation
  - Bicycle and Pedestrian Master Plan.
  - Zero Emission Mobility Program: Initiate a fleet of zero emissions vehicles.
  - AB 118 Alternative Fuel Vehicle Grant.
  - Urban Growth Boundary – General Plan Goal: Chapter 2.4 – Goal LU-A. Maintain a compact urban form with a defined UGB. Ensure land surrounding the City is maintained for open space.
  - Rail Service and Transit Center – General Plan Policy: Chapter 4 – Policies TR-33 through TR-34. Continue efforts to develop commuter rail service along Northwestern Pacific right-of-way and evaluate and implement a multi-hub transit corridor along Rohnert Park Expressway that incorporates a rail station, bus transfer station, frequent shuttles to Sonoma State, and parking.
  - Increased Bus Stops and Shelters – General Plan Policy: Chapter 4 – Policies TR-30 through TR-32. Determine locations of new bus stops in conjunction with increased transit service routes, require stops and shelter in conjunction with new development, and ensure stops and shelters comply with standards set in TR-32.
  - Increased Transit Service – General Plan Policy: Chapter 4 – Policies TR-28 through TR-29. Work with Sonoma County Transit and Golden gate transit to increase bus service, expand bus system for newly developed areas, explore the feasibility of a Sonoma State University campus shuttle and student discounts for transit.
  - Trip Reduction Ordinance: Municipal Code Chapter 10.80. All employers within the City of Rohnert Park with 100 or more employees at an individual job site shall disseminate trip reduction information regarding transportation alternatives including carpools, vanpools, transit and bicycling, and other methods of reducing trips such as telecommuting,

compressed work week, and flexible work hours annually to each employee and to all new employees as they are hired.

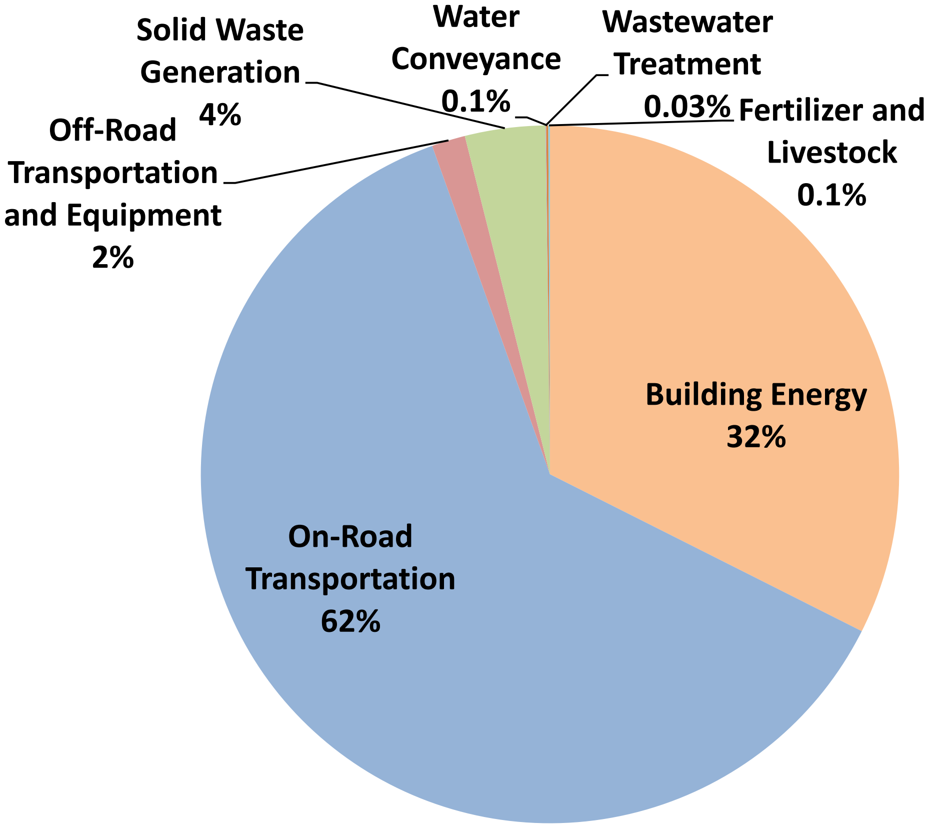
  - Transportation Demand Management for Carpools – General Plan Policy: Chapter 4 – Policy TR-22. Adoption of a non-mandatory employer-based transportation demand management program for Rohnert Park businesses. Intended to reduce the use of single-occupancy vehicles for the commute to work.
  - Alternative Transportation: General Plan Goal TR-F – Chapter 4. Encourage alternative modes of travel including transit, bicycle, and walking.
  - Parking Policies: reduced auto parking requirement for commercial to increase bike parking/storage. Also recognize compact car, preferential parking for EVs, hybrids.
  - New Parking Standards for Mixed Use Development – General Plan Policy: Chapter 4 – Policy TR-25. Reduce parking requirements for mixed used development, allow shared parking facilities, and cash-in-lie payments for required parking in mixed use areas.
  - Idling Ordinance: Limited number of drive-through with "general" prohibition.
  - Bicycle Circulation – General Plan Policy: Chapter 4 – Policies TR-39 through TR-43. Update Bicycle Master Plan to incorporate Class I bikeways, implement design standards for bikeways, ensure continuous and interconnected bikeways, and establish bike parking requirements in the Zoning Ordinance.
  - Pedestrian Circulation – General Plan Policy: Chapter 4 – Policies TR-37 and TR-38. Provide continuous sidewalks along all existing and future streets, and establish pedestrian-friendly amenities along streets running through mixed use, high residential, public, or park areas.
- Water and Wastewater Efficiency
  - Water Waste Regulations: Municipal Code Chapter 13.62. Promotes the efficient use of the entire water supply provided by the City; to eliminate the intentional or unintentional waste of water when a reasonable alternative solution is available; and to prohibit the use of equipment that is wasteful.
  - Water Shortage Emergency Plan: Municipal Code Chapter 13.66. Voluntary Conservation. Achieve an overall system-wide reduction goal of 10%.
  - Conservation Devices – General Plan Policy: Chapter 5 – Policy PF-15. Continue to require water-conserving devices for all new development.
  - Non-Residential Development – General Plan Policy: Chapter 5 – Policy PF-16. Require non-residential uses to implement water conservation practices as a condition of development
  - Rebates – General Plan Policy: Chapter 5 – Policy PF-18. Work with SCWA to offer rebates on non-residential water usage.

  - Water Audits for Businesses – General Plan Policy: Chapter 5 – Policy PF-20. At the request of businesses, conduct water audits and work with them to develop plans for reducing wastewater and discharge.
  - Water Conservation Program – General Plan Policy: Chapter 5 -Policy PF-22. Adopt a comprehensive water conservation program for City employees.
  - Best Management Practices – General Plan Policy: Chapter 5 – PF-23. Continue to implement water conservation BMPs.
  - Water Conservation Rate – General Plan Policy: Chapter 5 – Policy PF-25. Adopt a tiered water rate schedule that increases cost as the quantity of water used increases; and/or provides seasonal rates or excess-use surcharges.
  - Climate Action Projects Completed for water conservation:
    - Pool Covers (2006)
    - Decommission Community Center Fountain (2010)
    - Pump Measures (2006)
    - Tank Booster Station Improvement Projects (2008)
    - Pool Pump Measures
    - Pump Measures – Savings Criteria $1,500 (2010)
    - Closure of 1 Community Pool (2010)
  - Mandatory Conservation: System-wide reduction of 20% by making all voluntary measures mandatory.
- Urban Forestry and Natural Areas
  - Open Space Protection – General Plan Policy: Chapter 2.4 – Policy 2.4.2. Adjust UGB to protect agricultural or open spaces.
  - Open Space Designation – General Plan Policy: Chapter 5 – Policy OS-1. Ensure that land in the Planning Area designated as Open Space in the General Plan is maintained.
  - Specific Open Space Buffers – General Plan Policy: Chapter 5 – Policy OS – 2. Dedicate open space buffers along Petaluma Hill Road as part of the University District and Northeast Specific Plans.
  - Northwest Community Separator – General Plan Policy: Chapter 5 – Policy OS-4 through OS-4B: Requires 180 acres of land to be preserved in the Northwest Community Separator.
  - Acquisition of Open Space Land – General Plan Policy: Chapter 5 – Policy OS-4D. Adopt a mechanism to ensure open space protection from development either through mitigation or payment of a fee in lieu of acquisition.

    - Open Space Aggregation – General Plan Policy: Chapter 5 – Policy OS-5. Ensure open space parcels are aggregated to the maximum extent feasible to avoid piecemeal acquisition.
    - Creek Protection – General Plan Policy: Chapter 5 – Policy OS-7. Use creek protection zones for permanent public open space and compatible conservation purposes.
    - Wetlands Potential – General Plan Policy: Chapter 5 – Policy OS-8. Explore the feasibility of integrating wetlands and vernal pool areas with new development or open space areas.
    - Parks, Recreation, Open Space Plan – General Plan Policy: Chapter 5 – Policy OS-10. Prepare a Parks, Recreation, and Open Space Master Plan.
    - Natural Resource Protection – General Plan Policy: Chapter 2.4 – Policy 2.43. Add lands to the UGB to exclusively protect natural resources.
    - Wetland Conservation – General Plan Policy: Chapter 7 – Policy EC-5. Requires delineation of wetland and biological habitats in areas where development is set to occur.
    - Wetland and Restoration Funding – General Plan Policy: Chapter 7 – Policy EC-6.
    - Tree Planting Ordinance: replacement of trees if the ones removed are not sick/unsafe, or pay an in-lieu fee for trees to be planted by the City.
- General
    - Resolution No. 2007-164 and Plan C. Adoption of GHG Emissions Reduction Action Plan Analysis.
    - Approval of the GHG Emissions Reduction Action Plan Analysis. Adoption of “Plan C.” Approval of the GHG Emissions Reduction Action Plan Analysis.

### 5.5.3 Greenhouse Gas Inventory and Forecast

**Figure 5.5-2. Rohnert Park 2010 Community GHG Inventory by Source**



Rohnert Park's inventory follows a similar trend to the other communities in Sonoma County and the state. The majority of GHG emissions are from on-road transportation (62%) due to fossil fuel combustion. The next largest source is building energy (32%), which is due to the fossil fuel used to make electricity and natural gas used in homes, schools, businesses, and industrial practices. Residential uses account for most (65%) of the building energy emissions in Rohnert Park. Commercial uses account for 35% of building energy emissions. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

In Rohnert Park, total GHG emissions generated by community activities in 2010 were 264,260 $MTCO_2e$, which is approximately 7% of countywide GHG emissions in the same year. This is a 9% decrease from estimated 1990 emissions, which were 291,320 $MTCO_2e$. Table 5.5-3 shows the 1990 backcast, the 2010 inventory and business-as-usual (BAU) forecasts for 2015, 2020, 2040 and 2050 for the City of Rohnert Park.

## Table 5.5-3. Rohnert Park Community GHG Backcast, Inventory, and Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 84,930 | 29% | 85,750 | 32% | 98,490 | 31% | 113,990 | 31% | 119,030 | 32% | 124,360 | 33% |
| On-road Transportation | 158,100 | 54% | 164,230 | 62% | 202,600 | 64% | 238,700 | 64% | 226,890 | 61% | 227,460 | 60% |
| Off-road Transportation and Equipment | 4,020 | 1% | 4,120 | 2% | 5,130 | 2% | 6,860 | 2% | 12,220 | 3% | 12,660 | 3% |
| Solid Waste | 40,830 | 14% | 9,840 | 4% | 10,810 | 3% | 12,710 | 3% | 13,130 | 4% | 13,580 | 4% |
| Wastewater Treatment | 70 | 0% | 80 | 0.0% | 80 | 0% | 90 | 0% | 100 | 0% | 110 | 0% |
| Water Conveyance | 3,370 | 1% | 250 | 0.1% | 320 | 0% | 370 | 0% | 400 | 0% | 430 | 0% |
| **Total** | **291,320** | **100%** | **264,260** | **100%** | **317,430** | **100%** | **372,730** | **100%** | **371,780** | **100%** | **378,610** | **100%** |
| **Per-Capita Emissions** | **8.0** | | **6.4** | | **7.5** | | **7.9** | | **7.3** | | **6.9** | |

### 5.5.4 Greenhouse Gas Reduction Goal and Measures

The City of Rohnert Park joins the other Sonoma County communities to support the regional GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 22 local GHG reduction measures. The City's GHG emissions under 2020 BAU conditions (in absence of state, regional, and local reduction measures) would be approximately 372,730 $MTCO_2e$. The City's local GHG reduction measures, in combination with state and regional measures, would reduce the City's GHG emissions in 2020 to 251,970 $MTCO_2e$, which would be a reduction of approximately 32% compared to 2020 BAU conditions. The City will achieve these reductions through reduction measures that are technologically feasible and cost-effective per AB 32 through a combination of state (70%), regional (20%), and local (10%) efforts. Per-capita reductions in Rohnert Park in 2020 would be 2.6 $MTCO_2e$ per person. With the reduction measures in CA2020, per-capita emissions in Rohnert Park will be 5.3 MTCO2e per person, a 33% reduction in per capita emissions compared to 1990.

**Table 5.5-4. Rohnert Park 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

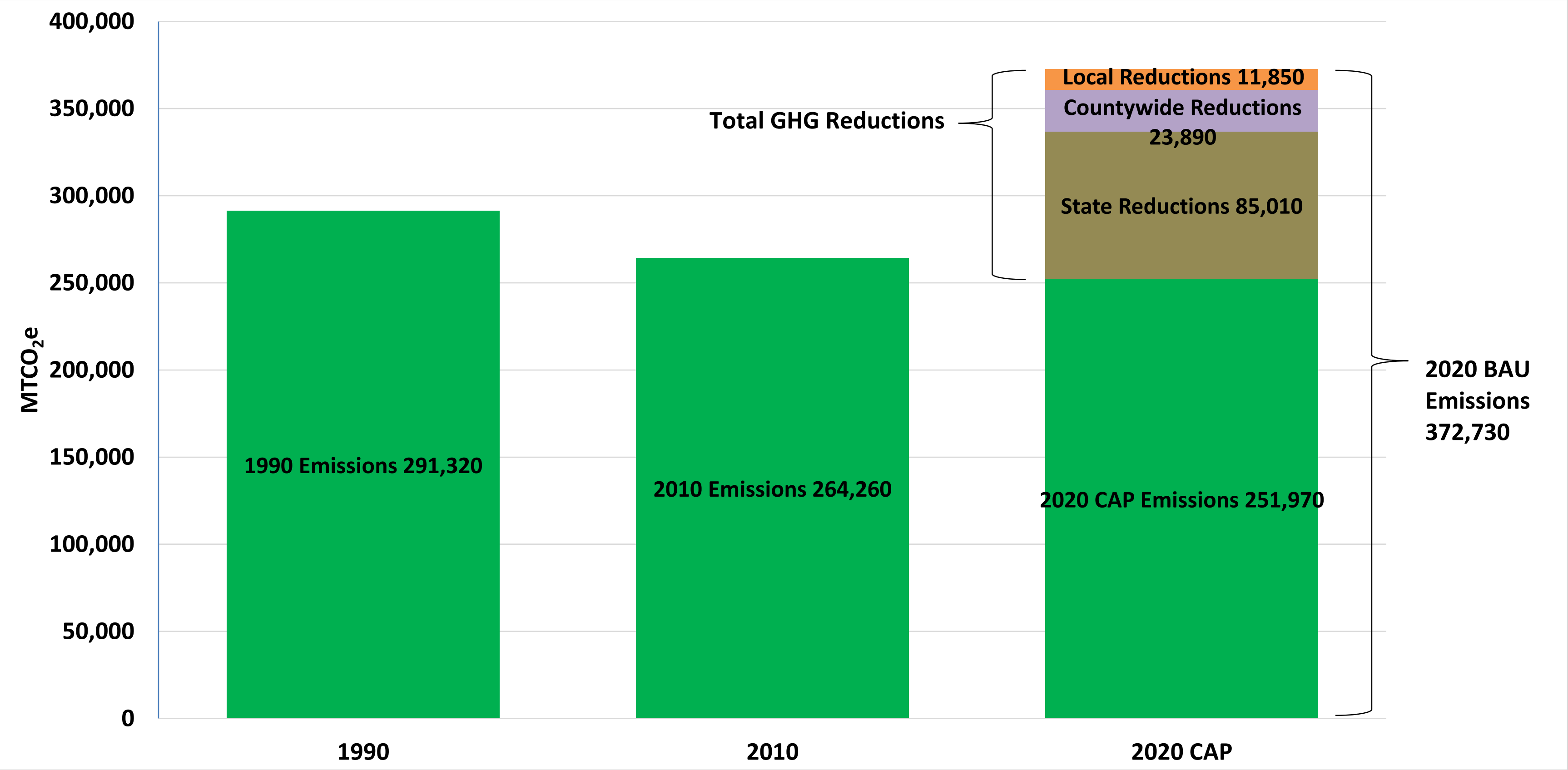
| Source | 2020 BAU Forecast | Reductions | | | | 2020 CAP Emissions | % Reduction From BAU |
|---|---|---|---|---|---|---|---|
| | | State | County-wide | Local | Total | | |
| Building Energy | 113,990 | 29,510 | 7,910 | 3,140 | 40,560 | 73,440 | 36% |
| On-Road Transportation | 238,700 | 54,890 | 6,020 | 3,820 | 64,730 | 173,980 | 27% |
| Off-Road Transportation and Equipment | 6,860 | 610 | - | 30 | 640 | 6,220 | 9% |
| Solid Waste | 12,710 | - | 9,570 | - | 9,570 | 3,130 | 75% |
| Water Conveyance | 370 | - | 300 | 4,860 | 5,160 | -[1] | 100% |
| Wastewater Treatment | 90 | - | 90 | - | 90 | - | 100% |
| **Total Emissions** | **372,730** | **85,010** | **23,890** | **11,850** | **120,760** | **251,970** | **32%** |
| | | **70%** | **20%** | **10%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures reduce improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.5-3 shows Rohnert Park's 1990 and 2010 GHG emissions total, 2020 BAU emissions forecast total, and the total emissions remaining after implementation of the City's reduction measures. The contribution of state, regional, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emissions reductions achieved in 2020. Like the other communities, Rohnert Park benefits greatly from the work the state and regional entities are committed to implementing on climate action. See Chapter 4 for more information on state and regional actions.

**Figure 5.5-3. Rohnert Park 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions**



## Greenhouse Gas Reduction Measures

As shown in Table 5.5-5, the City of Rohnert Park will achieve its reduction goal through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the City to comply with state mandates (e.g., Title 24 energy efficiency measures). State measure reductions total 85,010 $MTCO_2e$, which include the Pavley vehicle fuel efficiency standards, Title 24 building standards, the state's low carbon fuel standard, and the RPS, which will reduce GHG emissions from Rohnert Park's on-road and off-road transportation, and building energy use in 2020.

Regional measures will reduce emissions by 23,890 $MTCO_2e$ and will be implemented by regional entities, including the Regional Climate Protection Authority (RCPA), Sonoma County Water Agency (SCWA), County of Sonoma Energy Independence Office (ESD), Sonoma County Transportation Authority (SCTA), and Sonoma Clean Power (SCP).

An additional reduction of 11,850 $MTCO_2e$ will be achieved through locally adopted measures, relevant to the City of Rohnert Park. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent the actions that local communities can take directly. The communities have local control over their infrastructure and policies and have selected the local measures that best suit the needs of their community.

The three measures that will have the greatest impact in Rohnert Park are, in order of importance, Measure 2-L4 (Solar in Existing Non-Residential Buildings), Measure 2-L2 (Solar in Existing Residential Buildings), and Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009). These three measures, in addition to reducing GHG emissions, will save energy, improve air quality and public health in the City, and conserve natural resources. As the county and state continue to experience a historic drought, water conservation will remain an especially important co-benefit.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the City. Of the regional measures, the measures with the greatest impact are the Community Choice Aggregation (CCA) measure, the waste-to-energy measure, and the waste diversion measure.

Table 5.5-5 presents the individual GHG reduction measures that Rohnert Park has selected for the CAP. For more information on the specifics of each measure, see Appendix C.

**City of Rohnert Park Electric Municipal Vehicle Fleet**

Along with the other communities in the county, the City of Rohnert Park joined the Sonoma County Local Government Electric Vehicle (EV) Partnership to collaborate as a region on the implementation of EVs and EV charging infrastructure. Purchasing electric vehicles for the City's municipal vehicle fleet, and constructing vehicle charging infrastructure will help the City reduce its municipal operations GHG emissions.

## Table 5.5-5. Rohnert Park 2020 GHG Emissions Reductions by Measure

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---:|:---:|---|
| **State and Regional Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **7,341** | | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 3,634 | N/A | |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 2,291 | N/A | |
| Measure 1-S3: Industrial Boiler Efficiency | - | N/A | |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 103 | N/A | |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 1,313 | N/A | |
| **Goal 2: Increase Renewable Energy Use** | **30,072** | | |
| Measure 2-S1: Renewables Portfolio Standard | 23,461 | N/A | |
| Measure 2-S2: Solar Water Heaters | 122 | N/A | |
| Measure 2-R1: Community Choice Aggregation | 6,489 | N/A | |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | 4,142 | | |
| Measure 5-R1: Improve and Increase Transit Service | 71 | N/A | |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A | |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A | |
| Measure 5-R4: Trip Reduction Ordinance | 851 | N/A | |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A | |
| Measure 5-R6: Reduced Transit Passes | 788 | N/A | |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 630 | N/A | |
| Measure 5-R8: Safe Routes to School | 1,803 | N/A | |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **54,894** | |
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 51,165 | N/A |
| Measure 6-S2: Advanced Clean Cars | 1,524 | N/A |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 2,205 | N/A |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **2,482** | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 608 | N/A |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 1,874 | N/A |
| **Goal 9: Increase Solid Waste Diversion** | **3,760** | |
| Measure 9-R1: Waste Diversion Goal | 3,760 | N/A |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **5,814** | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 5,814 | N/A |
| **Goal 11: Reduce Water Consumption** | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | N/A |
| **Goal 12: Increase Recycled Water and Greywater Use** | **1** | |
| Measure 12-R1: Recycled Water* | 1 | N/A |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **113** | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 20 | N/A |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 93 | N/A |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 14: Increase Use of Renewable Energy in Water and Wastewater Systems** | **282** | | |
| Measure 14-R1: Sonoma County Water Agency Carbon Free Water by 2015 | 282 | N/A | |
| **Local Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **287** | | |
| Measure 1-L2: Outdoor Lighting | 276 | 50% | of outdoor lighting to participate |
| Measure 1-L3: Shade Tree Planting | 11 | 1,000 | trees planted |
| **Goal 2: Increase Renewable Energy Use** | **2,792** | | |
| Measure 2-L1: Solar in New Residential Development | 59 | 15% | of new houses to participate |
| Measure 2-L2: Solar in Existing Residential Building | 949 | 15% | of existing homes with solar |
| Measure 2-L3: Solar in New Non-Residential Developments | 185 | 10% | of new non-residential development to participate |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 1,599 | 10% | of existing non-residential development with solar |
| **Goal 3: Switch Equipment from Fossil Fuel to Electricity** | **63** | | |
| Measure 3-L1: Convert to Electric Water Heating | 63 | 5% | of households |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **1,773** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 862 | 20% | of growth to result in mixed use |
| Measure 4-L2: Increase Transit Accessibility | 846 | 75% | of growth to be 25+ units |
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| Measure 4-L4: Affordable Housing Linked to Transit | 64 | 15% | of new development to be affordable |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **2,042** | | |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 5-L1: Local Transportation Demand Management Program | 630 | 38% | of employees eligible |
| Measure 5-L2: Carpool-Incentives & Ride-Sharing Program | 1,229 | 78% | of employees eligible |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 183 | 100% | of trips affected |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **3** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 3 | 5 | charging stations installed |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | NQ | Yes | |
| **Goal 8: Reduce Idling** | **32** | | |
| Measure 8-L1: Idling Ordinance | NQ | 2 | minutes below state law |
| Measure 8-L2: Idling Ordinance for Construction Equipment | 32 | 2 | minutes below state law |
| **Goal 11: Reduce Water Consumption** | **4,862** | | |
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 4,441 | 37% | Reduction in per capita water use |
| Measure 11-L2: Water Conservation for New Construction* [1] | - | 100%/50% | % of new residential/ nonresidential development |
| Measure 11-L3: Water Conservation for Existing Buildings* | 421 | 25%/50% | % of new residential/ nonresidential development |
| **State Measure Reductions in Rohnert Park** | **85,010** | | |
| **Regional Measure Reductions in Rohnert Park** | **23,890** | | |
| **Local Measure Reductions in Rohnert Park** | **11,850** | | |
| **Grand Total Emissions Reductions in Rohnert Park** | **120,760** | | |

*Measures reduce emissions from multiple sources (i.e. water and energy)

NQ = not quantified

[1] Rohnert Park chose to participate in this measure, but there would be no reductions from this measure due to overlapping reductions with other water measures

### 5.5.5 Municipal Greenhouse Gas Reduction Measures

Like the other cities and the county, Rohnert Park has recognized the need to reduce GHG emissions from municipal operations. In 2007, the City adopted the "City of Rohnert Park Greenhouse Gas Emissions Reduction Action Plan Analysis." The City has completed 19 climate action projects aimed at reducing municipal GHG emissions, including lighting and equipment retrofits, fleet improvements, and installing solar electricity generation on City Hall. The City also plans to implement even more ambitious climate action projects in the future, including more PV installations and lower carbon fuels for the municipal fleet.

Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. Rohnert Park and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# Santa Rosa

## Commitments to meeting community greenhouse gas reduction goals.

# 5.6 Santa Rosa

The Santa Rosa City Council adopted a Climate Action Plan in June 2012 and a Municipal Climate Action Plan in 2013. This section provides information about Santa Rosa's greenhouse gas emissions profile and measures the City of Santa Rosa has adopted as well as how Santa Rosa's CAP works with CA 2020 and contributes to regional greenhouse gas emissions reductions to help meet state, regional, and local reduction targets.

## 5.6.1 Community Summary

Located in central Sonoma County, Santa Rosa is the county seat and the heart of Sonoma County. The largest city between Portland and San Francisco, Santa Rosa serves a four county region as the hub for technology and entrepreneurial businesses, retail, banking, and employment. It is a center of governmental services, home to the region's state and federal offices. Santa Rosa has a dynamic and well-balanced economy, anchored by strengths in tourism, high-tech manufacturing, and retail. Residents enjoy a superb quality of life. The city has a vibrant and active downtown with shops, restaurants, and events.

### Demographics

The city encompasses about 42 square miles and has a population of just over 173,000 in 2015. In 2010, the city's demographic composition was 29% Latino, 60% white, 2% black, 0.9% American Indian or Alaska Native, 5% Asian, 0.4% Native Hawaiian or other Pacific Islander, and 3% some other race or two or more races.

**Table 5.6-1 Santa Rosa Socioeconomic Data**

| | Actual | | | Projected |
|---|---|---|---|---|
| | 1990 | 2010 | 2015 | 2035 |
| Population | 113,313 | 167,815 | 173,031 | 237,000 |
| Housing | 47,711 | 67,396 | 68,551 | 96,295 |
| Employment | 58,761 | 72,513 | 85,000 | 132,100 |

Sources: California State Department of Finance, U.S. Census, California Employment Development Department, Santa Rosa General Plan 2035

### Energy and Water Use

Compared to households in the county as a whole, Santa Rosa households use less electricity and water but more natural gas. Additionally, they use less electricity, natural gas, and water than households statewide.

**Table 5.6-2. Santa Rosa, County, and State 2010 Average Energy and Water Use (per household, per year)**

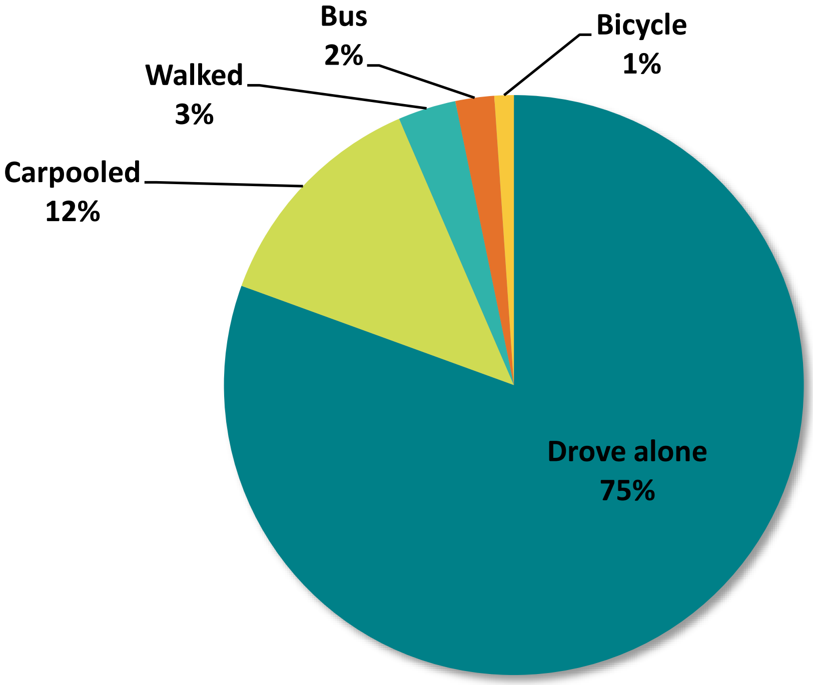
| | Santa Rosa | County | State |
|---|---|---|---|
| Electricity (kWh) | 5,959 | 7,042 | 9,320 |
| Natural Gas (Therms) | 453 | 413 | 512 |
| Water Use (Gallons) | 65,530 | 75,810 | 107,869 |

Sources:
City Data: provided by PG&E (energy) and by the City of Santa Rosa (water).
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In 2010, 74.6% of Santa Rosans drove alone to work while 11.9% carpooled. Slightly more than 2% used public transportation, 2.7% walked, and 1.4% bicycled. The mean travel time to work was 22.8 minutes. (U.S. Census Bureau 2014)

**Figure 5.6-1. Modes to Work in Santa Rosa in 2010**



Source: U.S. Census Bureau 2014: American Community Survey 2006-2010

### 5.6.2 Santa Rosa's Existing Actions to Reduce GHG Emissions

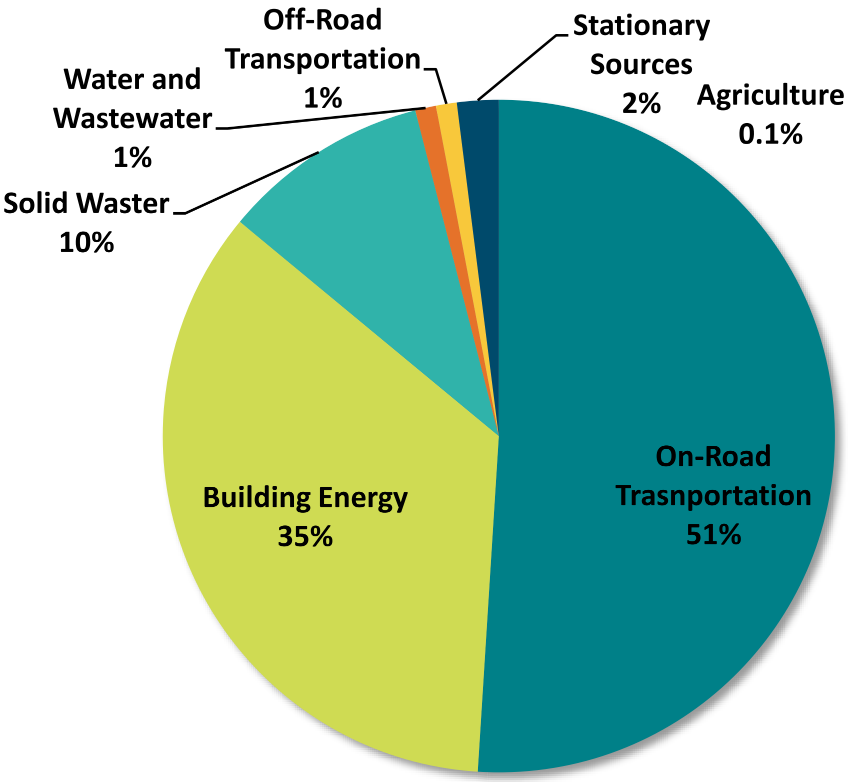
Santa Rosa continues to implement its Climate Action Plans to reduce energy use, promote renewable energy use, along with other actions to help reduce greenhouse gas emissions. The following highlights actions Santa Rosa has taken, or is implementing.

- Building Energy and Energy Efficiency
  - Santa Rosa's Build it Green voluntary program has evolved into a mandatory Tier 1 CalGreen program for residential and non-residential structures.
  - For over two decades, the City has installed energy efficient features in City facilities, including energy efficient lighting and heating, ventilation, and air conditioning units.
  - Cool roofs have been installed on several City buildings.
  - The City has partnered with the Sonoma County Energy Independence Program which offers low interest financing and technical assistance to property owners for energy efficiency retrofits.
  - Lighting in parks and on streets have been retrofit to improve efficiency.
  - General Plan Housing Element goal H-G-2 requires, as allowed by CalGreen Tier 1 standards, energy efficiency through site planning and building design by assisting residential developers in identifying energy conservation and efficiency measures appropriate to the Santa Rosa area. The Housing Element contains policies to implement this goal which address fuel efficient heating and cooling equipment, supporting partnerships for energy efficiency retrofits, and reducing use of water.
- Renewable Energy
  - Solar installations on City properties produce about 710,000 kilowatt hours of green energy annually as of 2016.
  - The City is planning to install solar panels on the rooftops of four parking garages.
  - Santa Rosa partnered with Sonoma State University to develop a biomass to energy program at the Laguna Treatment Plan, which included constructing wetlands and growing energy rich, non-food biomass in wastewater.
  - Santa Rosa pipes treated wastewater to the Geysers steam fields, which generates electricity for more than 100,000 households in Sonoma and other North Bay counties.
  - The City plants and issues permits for new trees annually (230 in 2015).
  - The City's municipal electricity accounts were enrolled in Sonoma Clean Power's "Clean Start" program.
  - The City of Santa Rosa was designated an Early Adopter through the Solar Powering America by Recognizing Communities, a program which will promote solar installations in the city.

- Land Use and Transportation
    - Santa Rosa has General Plan policies and a Bicycle and Pedestrian Master Plan which promote the addition of bicycle and pedestrian facilities. Such facilities are added each year through City's Capital Improvement Program.
    - The City has adopted the Downtown and North Station Area Specific Plans, illustrating support for higher density and greater intensity development surrounding Sonoma-Marin Area Rail Transit stations. In 2016, the City is in the process of completing the Roseland Area / Sebastopol Road Specific Plan, which is focused around the bus transfer center on Hearn Avenue.
    - The Reimagining CityBus process has resulted in a new service plan for bus transit in Santa Rosa, with improved headways.
    - Real-time transit information is available through the "My Santa Rosa CityBus Real-time Transit Information Program" via the web, smartphone app, and text.
    - The Santa Rosa Free Ride Trip Reduction Incentive Program provides incentives to encourage people to use a community alternative to travel to and from work.
    - The City has 10 electric vehicle charging stations at City facilities and plans to expand.
    - Electric and renewable diesel buses are being evaluated for addition to the fleet.
    - The City is developing progressive parking strategies throughout downtown, including demand responsive rates.
    - The City fleet includes hybrid, compressed natural gas, and electric vehicles.
- Water and Wastewater Efficiency
    - The City has sponsored "Drought Drive-Thru" events providing residents, free of charge, items such as water efficient shower fixtures, shower timers, spray nozzles, leak detectors, and buckets.
    - The "Take if from the Tap" program provides students with educational information about water use, along with a water bottle to encourage use of tap water rather than bottled water.
    - Water Department staff table at community events such as the Wednesday Night Market, to highlight water saving techniques and water-use efficiency to local residents.
    - Water Department staff hosts Graywater Workshops to provide residents information on how to design, install, use and maintain a laundry to landscape graywater irrigation system.
    - Free water saving toilets, shower heads, and faucet aerators are provided by Santa Rosa Water from time to time, including in 2015.
    - The City has expanded use of recycled water, sending about half of the Subregional System's to the Geysers, with other uses to irrigate public places, such as parks.

## 5.6.3 Greenhouse Gas Inventory and Forecast – 2007

**Figure 5.6-2. Santa Rosa Community GHG Inventory by Source**



Source: Santa Rosa Climate Action Plan, 2012

Since Santa Rosa previously developed a Climate Action Plan, its GHG inventory is from 2007 rather than 2010. As with other Sonoma County communities, the majority of emissions are from transportation due mostly to fossil fuel combustion in motor vehicles. The next largest source is building energy, which includes emissions related to energy used to heat homes and businesses in Santa Rosa.

Residential uses account for 55% of building energy emissions in Santa Rosa, with non-residential uses accounting for 45%. The other categories of emissions are smaller in comparison to transportation and building energy.

**Table 5.6-3. Santa Rosa Community GHG Inventory and Forecast**

| Source | 2007 Inventory | | 2015 Forecast | | 2020 Forecast | | 2035 Forecast | |
|---|---|---|---|---|---|---|---|---|
| Building Energy | 469,520 | 36% | 477,910 | 36% | 492,020 | 35% | 624,280 | 35% |
| On-Road Transportation | 684,280 | 52% | 691,190 | 52% | 728,820 | 52% | 959,470 | 53% |
| Off-Road Transportation | 17,670 | 1% | 17,990 | 1% | 18,810 | 1% | 23,580 | 1% |
| Solid Waste | 139,770 | 11% | 141,340 | 11% | 146,860 | 11% | 185,340 | 10% |
| Wastewater and Water | 9,840 | 1% | 9,950 | 1% | 10,340 | 1% | 13,040 | 1% |
| **Total** | **1,321,080** | | **1,338,380** | | **1,396,850** | | **1,805,710** | |
| **Total with state reductions** | | | **1,254,100** | | **1.235,180** | | **1,418,670** | |

Source: Santa Rosa Climate Action Plan, 2012
Notes: Forecasts are Business as Usual
Santa Rosa CAP includes agricultural emissions, which are not included in this chart.

The Business as Usual Forecast identifies how emissions would grow if consumption trends and efficiencies were to remain at 2007 levels. The forecasts are based on growth projected in the Santa Rosa General Plan. Since the General Plan horizon year is 2035, these projections do not match those for other communities in Climate Action 2020, which include 2040 and 2050.

When emissions are adjusted to account for state actions such as the Renewable Portfolio Standard, vehicle standards, and CalGreen building standards, the emissions forecasts are reduced, as shown in Table 5.6-3.

### 5.6.4 Greenhouse Gas Reduction Goal and Measures

The Santa Rosa CAP includes measures which will allow Santa Rosa to achieve the reduction target of 25% below 1990 emission levels by 2020. GHG reduction strategies aim to reduce GHG emissions from each source to avoid reliance on any one strategy or emissions source to achieve the target. In total, existing actions, state programs, and GHG measures identified by Santa Rosa will reduce emissions by 558,080 MTCO2e by 2020. Regional efforts to reduce GHGs are included in Santa Rosa's local measures (see Table 5.6-5), which is different than how they were addressed for the other communities in CA 2020, where they were separated out as regional strategies.

**Table 5.6-4. Total Santa Rosa GHG Reduction Summary by Topic**

| Source | 2020 GHG Reductions MTCO2e |
|---|---|
| State and local programs | 189,400 |
| Energy Efficiency and Conservation | 117,690 |
| Renewable Energy | 76,830 |
| Parking and Land Use Management | 32,680 |
| Improved Transport Options | 13,130 |
| Optimized Vehicular Travel | 59,850 |
| Waste Reduction, Recycling | 64,370 |
| Water and Wastewater | 3,750 |
| Off-Road Vehicles | 380 |
| **Total** | **558,080** |

## Greenhouse Gas Reduction Measures

Table 5.6.5 illustrates GHG reduction measures adopted in Santa Rosa's CAP.

**Table 5.6-5. Santa Rosa GHG Emissions Reductions by Measure**

| Santa Rosa Measure Number | Similar to CA2020 Measure Number | Santa Rosa Measure Name | 2020 GHG Reductions MTCO2e |
|---|---|---|---|
| **1** | **Goal 1, Goal 3** | **ENERGY EFFICIENCY** | |
| **1.1** | **1-L1** | **Continue to enforce CALGreen requirements[1]** | - |
| 1.1.1 | 1-L1 | New development compliance with Cal Green standards | |
| 1.1.2 | 1-L1 | Continue Tier 1 standards for new development | |
| 1.1.3 | 1-S1 | New development built with net zero electricity in 2020 | |
| 1.1.4 | 1-S1 | Evaluate incentives to net zero electricity prior to 2020 | |
| **1.2** | **1-L1, 1-L2, 1-L4** | **Facilitate energy efficiency in existing buildings** | 103,390 |
| 1.2.1 | 1-R1 | Provide information on free or low cost energy audits | |
| 1.2.2 | 1-R1 | Work with SCEIP to offer assistance, financing for retrofits | |
| 1.2.3 | 1-R1 | Create informational brochure/website for renters | |
| 1.2.4 | 1-R1 | Create informational brochure/website for historic buildings | |

| Santa Rosa Measure Number | Similar to CA2020 Measure Number | Santa Rosa Measure Name | 2020 GHG Reductions MTCO2e |
|---|---|---|---|
| 1.2.5 | 1-R1 | Seek funding to retrofit affordable housing units | |
| 1.2.6 | 1-R1 | Identify neighborhoods appropriate for retrofit pilot program | |
| 1.2.7 | 1-R1, 1-L2 | Reduce energy use in all City facilities | |
| 1.2.8 | 1-R1 | Reduce energy use in city schools and at SR Junior College | |
| 1.2.9 | 1-R1 | Reduce energy use in all existing buildings | |
| **1.3** | **1-R1** | **Smart Meter Utilization** | 7,650 |
| 1.3.1 | N/A | Require real-time energy monitors to track energy use | |
| 1.3.2 | N/A | Inform community regarding metering options | |
| 1.3.3 | 1-R1 | Provide information on appliance rebates | |
| **1.4** | **1-L3** | **Plant and maintain trees** | 1,640 |
| 1.4.1 | 1-L3 | Develop a tree inventory | |
| 1.4.2 | 1-L3 | Implement the City tree preservation ordinance | |
| 1.4.3 | 1-L3 | Require new development to provide public & private trees | |
| 1.4.4 | 1-L3 | Create an Urban Greening Policy | |
| 1.4.5 | 1-L3 | Develop a web application to provide updated tree information | |
| **1.5** | **N/A** | **Require new sidewalks, paving to have high solar reflectivity** | 250 |
| 1.5.1 | N/A | Adopt ordinance requiring use of cool paving materials | |
| 1.5.2 | N/A | Allow for green roofs and address historic structures. | |
| 1.5.3 | N/A | Create a Green Streets policy. | |
| **1.6** | **1-R2** | **Facilitate use of energy efficient appliances** | 520 |
| 1.6.1 | 1-R2 | Find funds to develop rebate program for appliances | |
| **1.7** | **3-L1** | **Switch natural gas appliances to electricity** | 4,240 |
| 1.7.1 | 3-L1 | Utilize appliance rebate program for replacement | |
| 1.7.2 | 3-L1 | Identify programs to facilitate replacement | |
| **2** | **Goal 2** | **RENEWABLE ENERGY** | |
| **2.1** | **2-R1, 2-L1, 2-L2, 2-L3, 2-L4** | **Support small-scale renewable energy systems** | Supportive |

| Santa Rosa Measure Number | Similar to CA2020 Measure Number | Santa Rosa Measure Name | 2020 GHG Reductions MTCO2e |
|---|---|---|---|
| 2.1.1 | 2-L1, 2-L2, 2-L3, 2-L4 | Update zoning code to remove barriers to these systems | |
| 2.1.2 | 2-L1, 2-L2, 2-L3, 2-L4 | Implement a solar policy | |
| 2.1.3 | 2-L1, 2-L2, 2-L3, 2-L4 | Consider pre-wiring and plumbing for these systems | |
| 2.1.4 | 2-L1, 2-L2, 2-L3, 2-L4 | Create municipal projects which include renewable energy | |
| **2.2** | **2-R1, 2-L1, 2-L2, 2-L3, 2-L4** | **Low interest financing for renewable energy installations** | 20,790 |
| 2.2.1 | 2-L1, 2-L2, 2-L3, 2-L4 | Partner with SCEIP to provide financing for solar | |
| 2.2.2 | 2-R1 | Explore feed-in-tariff to spur renewable energy installation | |
| **2.3** | **2-R1, 2-L1, 2-L2, 2-L3, 2-L4** | **Establish a comprehensive renewable energy program** | 56,040 |
| 2.3.1 | 2-R1 | Set renewable power generation goal by council resolution | |
| 2.3.2 | 2-R1 | Work with PG&E to increase use of renewable energy sources | |
| 2.3.3 | 2-R1 | Explore cost of Community Choice Aggregation | |
| 2.3.4 | 2-L1, 2-L2, 2-L3, 2-L4 | Evaluate feasibility of mid-size renewable projects in City | |
| **3** | **Goal 4, Goal 5** | **Parking and Land Use** | |
| **3.1** | **4-L1, 4-L2, 4-L3, 4-L4** | **Increase jobs and housing density downtown & near transit** | 11,680 |
| 3.1.1 | 4-L3 | Support Urban Growth Boundary | |
| 3.1.2 | 4-L1, 4-L2, 4-L3, 4-L4 | Implement station plans and corridor plans | |
| **3.2** | **4-L1, 4-L3** | **Complementary land uses to decrease need for vehicle travel** | 6,270 |
| 3.2.1 | N/A | Work with employers to provide on-site services | |
| 3.2.2 | 5-R7, 5-R8, 5-R10, 5-L4, 5-L5 | Improve non-vehicular network to promote walking, biking | |
| 3.2.3 | 4-L1 | Support mixed use, higher density development near services | |
| **3.3** | **4-L4** | **Support development of affordable housing** | 960 |

| Santa Rosa Measure Number | Similar to CA2020 Measure Number | Santa Rosa Measure Name | 2020 GHG Reductions MTCO2e |
|---|---|---|---|
| 3.3.1 | 4-L4 | Provide affordable housing near transit | |
| 3.3.2 | 4-L4 | Implement the Housing Allocation Plan | |
| **3.4** | **5-L6** | **Limit free parking in high traffic areas** | 12,030 |
| 3.4.1 | 5-L6 | Price on street parking relative to congestion | |
| 3.4.2 | 5-L6 | Implement residential permit program | |
| 3.4.3 | 5-L6 | Evaluate the zoning code to reduce parking where appropriate | |
| **3.5** | **5-L6** | **Unbundle price of parking from property costs** | 940 |
| 3.5.1 | 5-L6 | Investigate mechanisms to unbundle parking from property cost | |
| 3.5.2 | 5-L6 | Implement policy to encourage unbundled parking | |
| **3.6** | **5-L4, 5-L5** | **Provide traffic calming to encourage walking and biking** | 800 |
| 3.6.1 | 5-L4, 5-L5 | Install calming features to improve ped/bike experience | |
| **4** | **Goal 5, Goal 7** | **Increase safe, reliable alternatives to vehicle travel** | |
| **4.1** | **5-R7, 5-R8, 5-R10, 5-L4, 5-L5** | **Improve the bicycle and pedestrian network** | 1,880 |
| 4.1.1 | 5-R8, 5-R10, 5-L4 | Implement the Bicycle and Pedestrian Master Plan | |
| 4.1.2 | 5-L4 | Update bicycle parking regulations | |
| 4.1.3 | 5-L4 | Provide bicycle safety training to residents and employees | |
| 4.1.4 | 5-R8, 5-L4 | Continue to support Safe Routes to School and transit programs | |
| 4.1.5 | 5-R10, 5-L4 | Implement a bike-share program | |
| **4.2** | **5-R1, 5-R2, 5-R3, 5-R4, 5-R5, 5-R6, 5-R7** | **Improve transit to and within Santa Rosa** | 6,410 |
| 4.2.1 | 5-R1, 5-R7 | Provide real time arrival and departure information | |
| 4.2.2 | 5-R1 | Provide safe spaces to wait for bus arrival | |
| 4.2.3 | 5-R3 | Support establishment of SMART rail service | |
| 4.2.4 | 5-R3 | Explore high frequency/rapid bus along major transit corridors | |
| 4.2.5 | 7-R2 | Replace bus fleet with GHG reducing vehicles | |

| Santa Rosa Measure Number | Similar to CA2020 Measure Number | Santa Rosa Measure Name | 2020 GHG Reductions MTCO2e |
|---|---|---|---|
| 4.2.6 | 5-R1, 5-R2 | Evaluate system performance to maximize transit trips provided | |
| 4.2.7 | 5-R1, 5-R2 | Evaluate measures to increase transit ridership | |
| **4.3** | **5-R1, 5-R2, 5-R3, 5-R4, 5-R5, 5-R6, 5-R7, 5-R9, 5-L1, 5-L2, 5-L3, 5-L6, 5-L7** | **Increase shared vehicle and transit trips** | 4,010 |
| 4.3.1 | 5-R9 | Work to establish a car-sharing operation in Santa Rosa | |
| 4.3.2 | 5-R4, 5-R5, 5-L1, 5-L2, 5-L7 | Work with large employers to provide rideshare programs | |
| 4.3.3 | 5-R4, 5-R5, 5-R6, 5-L2, 5-L3, 5-L7 | Consider expanding employee programs promoting transit use | |
| 4.3.4 | 5-R5, 5-L2, 5-L7, | Provide awards for employee use of alternative commute options | |
| 4.3.5 | 5-R4, 5-R5 | Encourage new employers of 50+ provide subsidized transit passes | |
| 4.3.6 | 5-R6 | Work with local school districts, SRJC to provide subsidized passes | |
| 4.3.7 | 5-L6, 5-L7 | Identify locations for additional park-and-ride lots | |
| **4.4** | **5-L4** | **Consider Car-Free Sunday demonstration for use of streets** | Supportive |
| 4.4.1 | 5-L4 | Designate some Sundays as car-free in different neighborhoods | |
| **4.5** | **5-R5, 5-L1** | **Encourage remote work centers and telecommuting** | 830 |
| 4.5.1 | 5-R5, 5-L1 | Promote workplace alternatives including telecommuting | |
| **5** | **Goal 6, Goal 7, Goal 8** | **Increase use of alternatively fueled vehicles** | |
| **5.1** | **7-R1, 7-R2, 7-L1** | **Facilitate use of electric and hybrid vehicles** | 2,600 |
| 5.1.1 | 7-R1, 7-L1 | Provide electric recharging stations in City facilities/lots | |
| 5.1.2 | 7-R1, 7-L1 | Require new parking lots to include electric vehicle recharging | |
| 5.1.3 | 7-R1, 7-L1 | Allow EV charging stations as permitted uses in larger parking lots | |

| Santa Rosa Measure Number | Similar to CA2020 Measure Number | Santa Rosa Measure Name | 2020 GHG Reductions MTCO2e |
|---|---|---|---|
| 5.1.4 | 7-R1, 7-L1 | Provide priority parking for electric hybrid vehicles in city lots | |
| 5.1.5 | 7-R1 | Consider rebates for employee purchase of electric vehicles | |
| 5.1.6 | 7-R1, 7-L1 | Expand electric vehicle charging network | |
| **5.2** | **7-R2, 7-L2, 7-L3** | **Support Low Carbon Fuel Standard & alternative fuels** | 52,480 |
| 5.2.1 | 6-S1 | Require new fueling stations to provide alternative fuels | |
| 5.2.2 | 6-S1 | Offer guidance about diesel-to-biodiesel conversions | |
| 5.2.3 | 6-S1, 7-R2 | Develop tri-generation fuel cell for City/public vehicles | |
| 5.2.4 | 6-S1 | Develop alternative fueling stations in Santa Rosa | |
| 5.2.5 | 6-S1 | Increase participation in SRJC alternative fuel classes | |
| **5.3** | **8-L1, 8-L2** | **Limit vehicle idling** | 2,140 |
| 5.3.1 | 8-L1 | Work with law enforcement to enforce state idling rules | |
| 5.3.2 | 8-L1 | Shut off cars when waiting to pick up children at school | |
| 5.3.3 | 8-L1 | Consider amending zoning code to prohibit new drive-through facilities | |
| **5.4** | **7-R1** | **Facilitate use of neighborhood electric vehicles (NEV)** | 2,630 |
| 5.4.1 | 7-R1 | Identify streets appropriate for NEV | |
| 5.4.2 | 7-R1 | Create a NEV street network | |
| 5.4.3 | 7-R1 | Explore rebates for purchases of NEV | |
| 5.4.4 | 7-R1 | Develop a map and signage for NEV network | |
| **6** | **Goal 9** | **Reduce solid waste sent to landfill from Santa Rosa** | |
| **6.1** | **9-R1, 9-L1** | **Increase recycling and composting of waste** | 64,370 |
| 6.1.1 | 9-R1 | Increase waste accepted for curbside recycling | |
| 6.1.2 | 9-R1 | Work with Waste Management to encourage composting/recyclable containers | |
| 6.1.3 | 9-L1 | Increase diversion of construction waste | |
| **6.2** | **9-R1** | **Reduce use of non-recyclable materials** | Supportive |
| 6.2.1 | 9-R1 | Discourage use of Styrofoam and plastic bags | |
| 6.2.2 | 9-R1 | Reduce amounts of packaging used | |
| 6.2.3 | 9-R1 | Discourage bottled water at City events | |

| Santa Rosa Measure Number | Similar to CA2020 Measure Number | Santa Rosa Measure Name | 2020 GHG Reductions MTCO2e |
|---|---|---|---|
| 6.2.4 | 9-R1 | Divert 75% of waste by 2020 | |
| **7** | **Goal 11, Goal 12, Goal 13, Goal 14** | **Improve water & wastewater efficiency** | |
| **7.1** | **11-R1, 11-L1, 11-L2, 11-L3, 12-L1** | **Conserve water** | 1,700 |
| 7.1.1 | 11-L2 | Require reduction in potable water for new development | |
| 7.1.2 | 11-L1, 11-L2, 11-L3 | Expand water conservation efforts | |
| 7.1.3 | 11-L1 | Use water meters which track real-time water use | |
| 7.1.4 | N/A | Utilize smart water meters to save water and costs | |
| **7.2** | **13-R1, 13-R2** | **Improve efficiency of water/wastewater facilities** | 2,050 |
| 7.2.1 | 2-R1, 12-R1 | Provide recycled water to Geysers to generate clean energy | |
| 7.2.2 | 14-L1 | Install innovative renewable energy projects at treatment plant | |
| **7.3** | **12-R1** | **Increase use of recycled water in Santa Rosa** | |
| 7.3.1 | 12-R1 | Expand infrastructure network to deliver recycled water | |
| 7.3.2 | 12-R1 | Install dual plumbing in some new development | |
| **8** | **Goal 18** | **Improve efficiency of agricultural operations/food consumption** | |
| **8.1** | **18-R1, 18-R2, 18-R3** | **Increase amount of food grown and consumed locally** | Supportive |
| 8.1.1 | 18-R3 | Incentivize residential agriculture | |
| 8.1.2 | 18-R3 | Promote growing of fruits/vegetables in front yards | |
| 8.1.3 | 18-R3 | Establish community gardens and urban farms | |
| 8.1.4 | 18-R3 | Revise zoning code to allow small animals, chickens, bees | |
| 8.1.5 | 18-R2 | Promote Slow Food campaign for restaurants/wineries | |
| **9** | **Goal 7, Goal 8, Goal 11** | **Reduce emissions from construction & lawn/garden activities** | |
| **9.1** | **7-L2** | **Encourage use of electric lawn and garden equipment** | 20 |
| 9.1.1 | 7-L2 | Re-establish voluntary exchange of gas mowers/blowers | |

| Santa Rosa Measure Number | Similar to CA2020 Measure Number | Santa Rosa Measure Name | 2020 GHG Reductions MTCO2e |
|---|---|---|---|
| 9.1.2 | 7-L2 | Encourage provision of outside outlets | |
| 9.1.3 | 11-L2, 11-L3 | Replace high water use landscapes | |
| **9.2** | **8-L2** | **Reduce construction equipment emissions** | 360 |
| 9.2.1 | 8-L2 | Minimize idling time to 5 minutes or less | |
| 9.2.2 | 8-L2 | Maintain construction equipment per manufacturer's specs | |
| 9.2.3 | 8-L2 | Limit GHG construction equipment emissions with measures | |
| **Grand Total Emissions Reductions in Santa Rosa[2]** | | | **368,680** |

Notes:

[1] GHG reductions from CalGreen requirements are included in existing activities. For more information, see the Santa Rosa CAP.

[2] Does not include state measures reductions (161,760 MTCO2e), or existing measure reductions (27,640 MTCO2e)

# Sebastopol

## Commitments to meeting community greenhouse gas reduction goals.

# 5.7 Sebastopol

This section presents the community greenhouse gas (GHG) emissions profile specific to Sebastopol and the measures that the City of Sebastopol will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.7.1 Community Summary

Sebastopol has a unique and highly valued small-town character. Sebastopol is the hub of West Sonoma County. While the incorporated area is small, Sebastopol serves a much larger unincorporated area stretching to the Pacific Ocean and the Russian River. The City's "market area" comprises a population of approximately 30,000 to 50,000 people, who, to varying degrees, use Sebastopol as their "town" for goods, services, and recreational and cultural activities. Thus, the town has far more economic activity, traffic, and recreational and cultural services than would be apparent based simply on the incorporated population.

The City is surrounded by vineyards, orchards, rural residential, and wetlands, located minutes from the Sonoma Coast and the Russian River area, and just 52 miles north of San Francisco. Sebastopol is at the crossroads of two State Highways, Highways 116 and 12, and is just 8 miles from the county's largest city, Santa Rosa. Sebastopol has a typical Mediterranean climate, with summertime highs above 83 degrees and wintertime lows near 35 degrees.

### Demographics

Sebastopol spans 1.9 square miles and has largely residential and commercial land uses. The City had a population of 7,379 as of the 2010 census. In 2020 the population of Sebastopol is expected to be 7,613, an increase of 3% over 2010. Employment in the area is expected to increase by 20%. Sebastopol's demographic composition in 2010 was 88% White, 1% African American, 0.8% Native American, 1.6% Asian, 0.3% Pacific Islander, 4% from other races, and 4% from two or more races. Persons of Hispanic or Latino origin were 12%.

As shown in Table 5.7-1, the City is expected to experience modest but steady growth in population, housing, and jobs in the future.

### Table 5.7-1. Sebastopol Socioeconomic Data

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | 1990 | 2010 | 2015 | 2020 | 2040 | 2050 |
| Population | 7,004 | 7,379 | 7,497 | 7,613 | 8,188 | 8,608 |
| Housing (# of Houses) | 2,842 | 3,345 | 3,431 | 3,521 | 3,803 | 3,994 |
| Employment | 4,301 | 5,102 | 5,507 | 6,147 | 6,668 | 6,827 |

Socioeconomic data were derived from the SCTA travel demand model and incorporate input from the City based on its internal planning forecasts.

According to the 2010 Census data, Sebastopol is majority owner-occupied with 53% of all houses owner-occupied and 47% renter-occupied.

## Energy and Water Use

Compared to households in the county as a whole, Sebastopol households use less electricity and water but more natural gas. They also use less electricity, natural gas, and water than households statewide.

### Table 5.7-2. Sebastopol, County, and State 2010 Average Energy and Water Use (per household, per year)

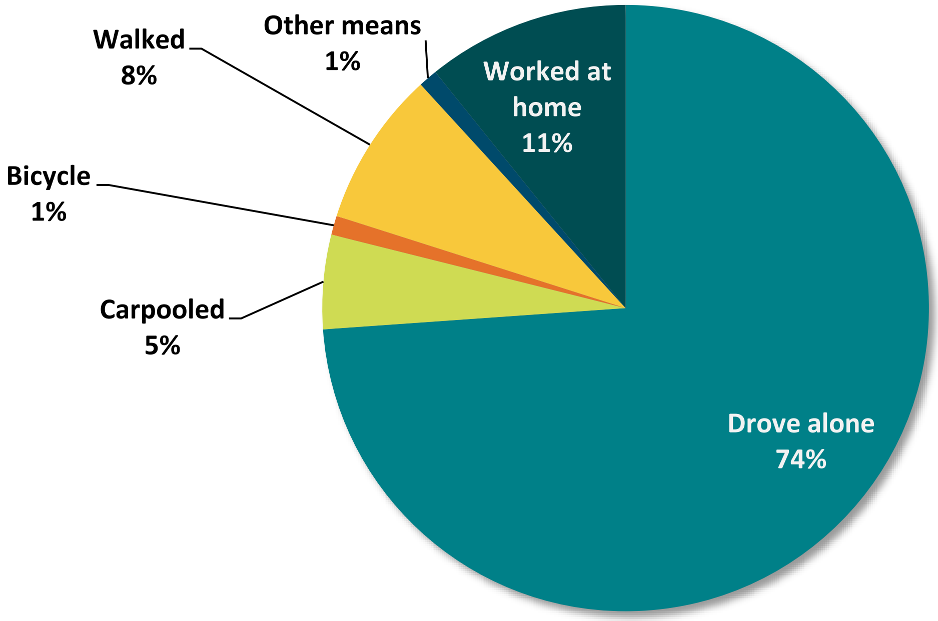
| | Sebastopol | County | State |
|---|---|---|---|
| Electricity (kWh) | 5,606 | 7,042 | 9,320 |
| Natural Gas (Therms) | 468 | 413 | 512 |
| Water Use (Gallons) | 64,833 | 75,810 | 107,869 |

Sources:
City Data: provided by PG&E (energy) and by the City of Sebastopol (water).
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In the inventory year 2010, most Sebastopol residents (74%) drove to work alone, with about 5% carpooling. It takes a Sebastopol resident on average 24 minutes to get to work (U.S. Census Bureau 2014).

Figure 5.7-1. Modes to Work in Sebastopol in 2010



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

### 5.7.2 Sebastopol's Existing Actions to Reduce GHG Emissions

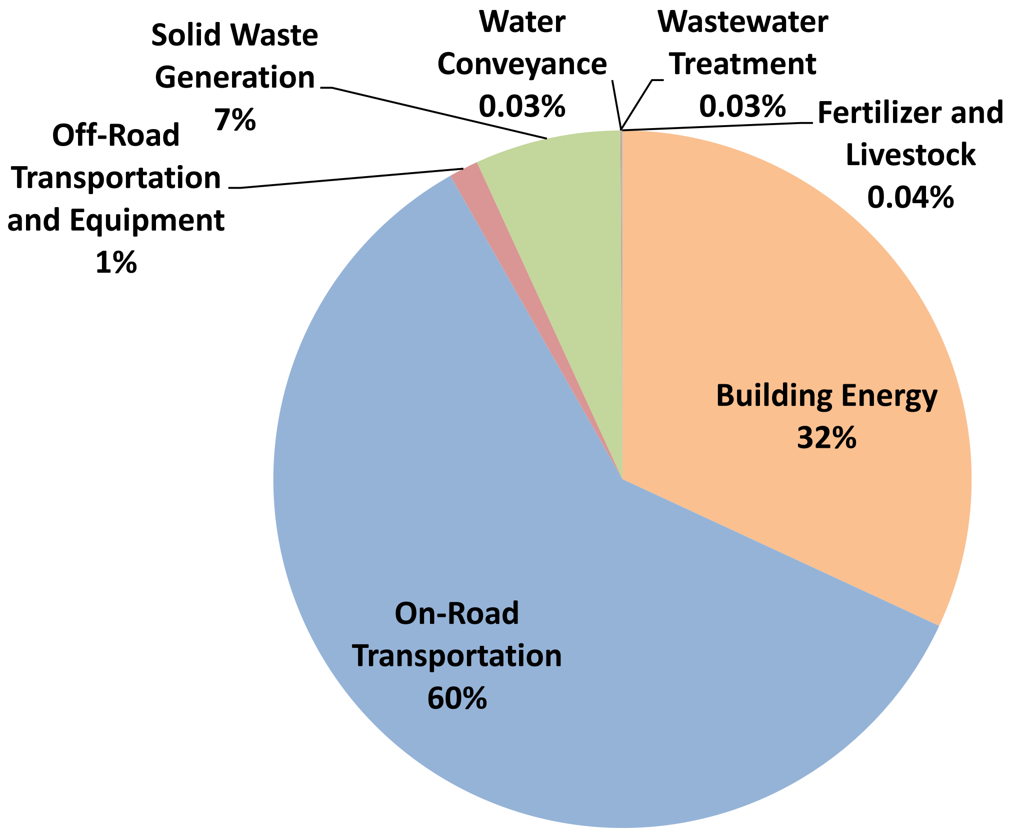
Sebastopol has already taken a number of steps to reduce energy use, promote renewable energy use, and other actions that have been helping to reduce GHG emissions. The City has adopted the following ordinances and General Plan policies that help to reduce GHG emissions and will support the implementation of the formal GHG reduction measures in this CAP.

- Building Energy
  - Residential Retrofits: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
  - Residential Appliance Upgrades: Programs through PG&E and other agencies.
  - Solar Installations at Residences: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
  - Solar Sonoma County program (Resolution No. 5696).
  - LED Light Bulbs program (Resolution No. 5816).
  - Green Building Ordinance: Adoption of Tier 1 Voluntary measures for residential and non-residential structures adopted as mandatory requirements (Municipal Code Chapter 15.04.140).
- Land Use and Transportation
  - Bicycle and Pedestrian Master Plan.

  - Urban Growth Boundary: General Plan Policy – Chapter 1: Goal 2: P.9.
  - Measure O: Urban Growth Boundary Initiative.
  - Zero Emission Dedicated Electric Vehicles Program (Resolution No. 5729).
  - Plug-In Electric Vehicles or Hybrids – Plug In Partners (Resolution 5674).
  - Promote measures to reduce travel demand: General Plan Policy – Chapter 2: Goal 10: P.27 Continue to implement the Trip Reduction Ordinance.
  - Encourage transit use: General Plan Policy – Chapter 2: Goal 6: P.19 Continue to support and expand the Sebastopol Transit Service.
  - Reduce regional traffic growth: General Plan Policy – Chapter 2: Goal 1: P.2 Coordinate with the Sonoma County Congestion Management Plan.
  - Support regional alternatives to single-occupant vehicle: General Plan Policy – Chapter 2: Goal 1: P.3 Support policies and programs which increase the use of transit, carpools, bicycles, etc.
- Water and Wastewater Efficiency
  - Grey Water: two multifamily developments have installed systems.
  - Water and Sewerage System Conservation Requirements: Municipal Code Chapter 13.04.
  - Urban Runoff Reduction Requirements: Municipal Code Chapter 15.77.
  - Water Fixture Retrofits Water Conservation Rebate Program: Resolution No. 5621 Resolution to amend incentives for water conservation.
  - Water and Energy Conservation Requirements: Municipal Code Chapter 15.74.
  - Water Efficient Landscaping Requirements: Municipal Code Chapter 15.36.
- Urban Forestry and Natural Areas
  - Open Space Conservation Tree Planting: planted thousands of trees in Laguna de Santa Rosa Wetlands Preserve.
  - Street Tree Program.
  - Adopt a Landscape Program.
  - Tree Protection Ordinance: Municipal Code Chapter 8.12.
- Waste Minimization and Recycling
  - Food Waste: Sebastopol residents may put all vegetative food waste in their yard debris.

### 5.7.3 Greenhouse Gas Inventory and Forecast

**Figure 5.7-2. Sebastopol 2010 Community GHG Inventory by Source**



Sebastopol's inventory is similar to other cities in the county and state. The majority of the emissions are from on-road transportation due to fossil fuel combustion in personal and light-duty vehicles. The next largest source is building energy, which includes emissions related to energy used to heat the homes, and business in Sebastopol. Residential uses account for most (52%) of the building energy emissions in Sebastopol. Commercial uses account for 48% of building energy emissions. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

In Sebastopol, total GHG emissions generated by community activities in 2010 were 76,330 MTCO$_2$e, which is approximately 2% of countywide GHG emissions in the same year. This is a 4% increase from estimated 1990 emissions, which were 73,230 MTCO$_2$e. Table 5.7-3 shows the 1990 backcast, the 2010 inventory and business-as-usual (BAU) forecasts for 2015, 2020, 2040 and 2050 for the City of Sebastopol.

## Table 5.7-3. Sebastopol Community GHG Backcast, Inventory, and Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 21,840 | 30% | 24,370 | 32% | 26,980 | 32% | 28,930 | 31% | 31,320 | 32% | 32,450 | 33% |
| On-road Transportation | 42,030 | 57% | 45,730 | 60% | 51,540 | 60% | 56,550 | 61% | 55,800 | 58% | 54,990 | 57% |
| Off-road Transportation and Equipment | 970 | 1% | 1,040 | 1% | 1,260 | 1% | 1,570 | 2% | 2,930 | 3% | 3,020 | 3% |
| Solid Waste | 8,010 | 11% | 5,150 | 7% | 5,450 | 6% | 5,900 | 6% | 6,380 | 7% | 6,590 | 7% |
| Wastewater Treatment | 20 | 0% | 20 | 0.0% | 20 | 0% | 20 | 0% | 20 | 0% | 20 | 0% |
| Water Conveyance | 370 | 1% | 30 | 0.0% | 30 | 0% | 30 | 0% | 30 | 0% | 30 | 0% |
| **Total** | **73,230** | **100%** | **76,330** | **100%** | **85,280** | **100%** | **92,990** | **100%** | **96,480** | **100%** | **97,100** | **100%** |
| **Per-Capita Emissions** | **10.5** | | **10.3** | | **11.4** | | **12.2** | | **11.8** | | **11.3** | |

## 5.7.4 Greenhouse Gas Reduction Goal and Measures

The City of Sebastopol joins other Sonoma County communities to support the regional GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 27 local GHG reduction measures. The City's GHG emissions under 2020 BAU conditions (in absence of state, regional, and local reduction measures) would be approximately 92,990 $MTCO_2e$. The City's local GHG reduction measures, in combination with state and regional measures, would reduce the City's GHG emissions in 2020 to 63,430 $MTCO_2e$, which would be a reduction of approximately 32% compared to 2020 BAU conditions. The City will achieve these reductions through reduction measures that are technologically feasible and cost-effective per AB 32 through a combination of state (64%), regional (26%), and local (10%) efforts. With the reduction measures in CA2020, per-capita emissions in Sebastopol will be 8.3 MTCO2e per person, a 20% reduction in per capita emissions compared to 1990.

**Table 5.7-4. Sebastopol 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

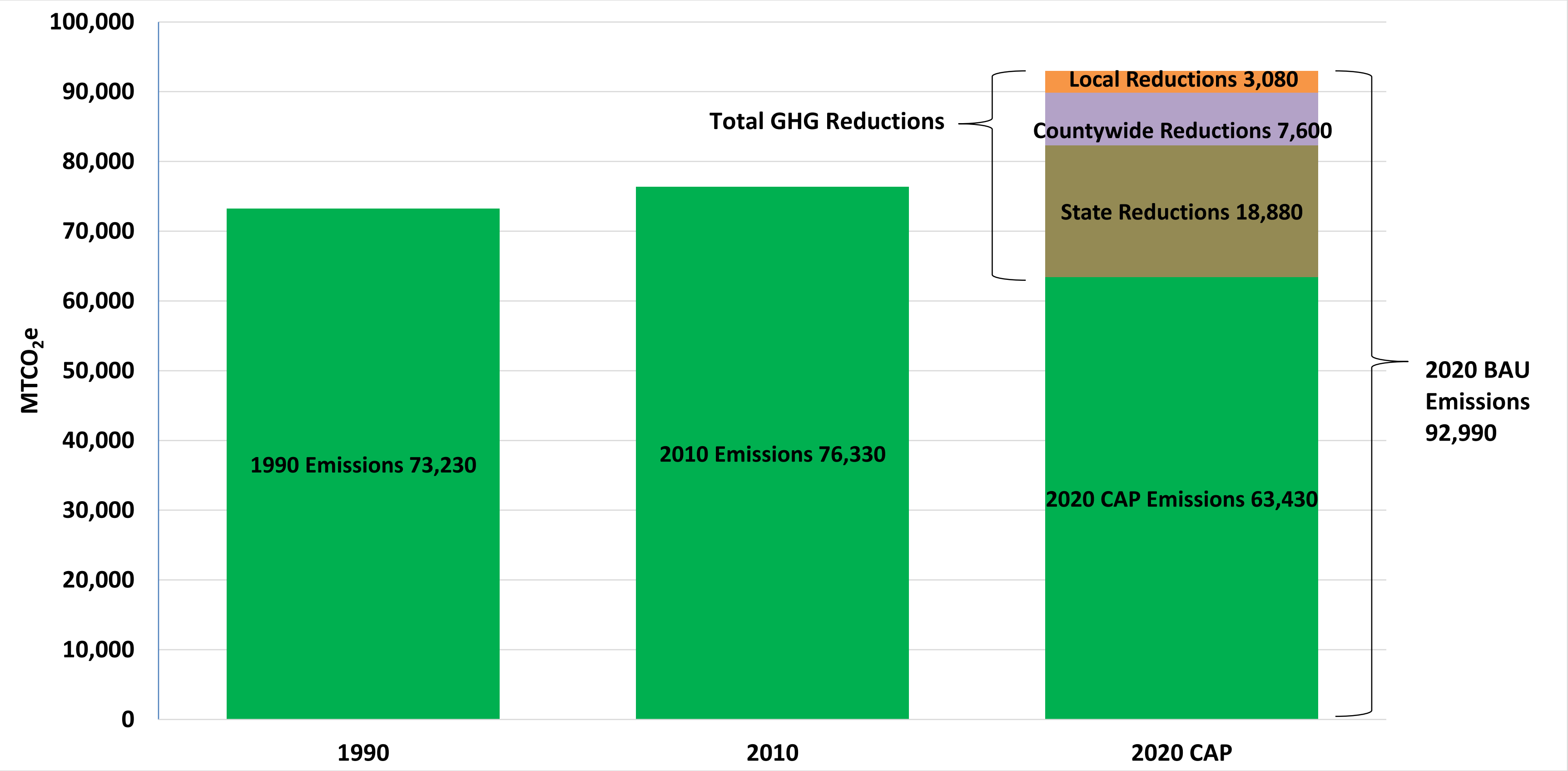
| | | Reductions | | | | | |
|---|---|---|---|---|---|---|---|
| **Source** | **2020 BAU Forecast** | **State** | **County-wide** | **Local** | **Total** | **2020 CAP Emissions** | **% Reduction From BAU** |
| Building Energy | 28,930 | 6,780 | 1,770 | 1,780 | 10,320 | 18,600 | 36% |
| On-Road Transportation | 56,550 | 11,970 | 1,360 | 720 | 14,050 | 42,500 | 25% |
| Off-Road Transportation and Equipment | 1,570 | 140 | - | 50 | 190 | 1,390 | 12% |
| Solid Waste | 5,900 | - | 4,450 | - | 4,450 | 1,450 | 75% |
| Water Conveyance | 30 | - | 10 | 530 | 540 | -[1] | 100% |
| Wastewater Treatment | 20 | - | 10 | - | 10 | 10 | 69% |
| **Total Emissions** | **92,990** | **18,880** | **7,600** | **3,080** | **29,560** | **63,430** | **32%** |
| | | **64%** | **26%** | **10%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures reduce improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.7-3 shows Sebastopol's 1990 and 2010 GHG emissions total, 2020 BAU emissions forecast total, and the total emissions remaining after implementation of the City's reduction measures. The contribution of state, regional, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emissions reductions achieved in 2020. Like the other communities, Sebastopol benefits greatly from the work the state and regional entities are committed to implementing on climate action. See Chapter 4 for more information on state and regional actions.

**Figure 5.7-3. Sebastopol 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions**



## Greenhouse Gas Reduction Measures

As shown in Table 5.7-5, the City of Sebastopol will achieve its reduction goal through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the City to comply with state mandates (e.g., Title 24 energy efficiency measures). State measure reductions total 18,880 $MTCO_2e$, which include the Pavley vehicle fuel efficiency standards, Title 24 building standards, the state's low carbon fuel standard, and the RPS, which will reduce GHG emissions from Sebastopol's on-road and off-road transportation and building energy use in 2020.

**Sustainable Sebastopol**

Sebastopol has committed to a diverse range of programs and policies that reduce the emissions of GHGs. The City maintains a list of the programs, policies, and resolutions that it has adopted, and tips for members of the community to take on the City website. One of these resolutions, adopted in 2002, establishes the City's official support for the use of alternatively fueled vehicles for the City's municipal fleet.

Regional measures will reduce emissions by 7,600 $MTCO_2e$ and will be implemented by regional entities, including the Regional Climate Protection Authority (RCPA), Sonoma County Water Agency (SCWA), County of Sonoma Energy Independence Office (ESD), Sonoma County Transportation Authority (SCTA), and Sonoma Clean Power (SCP).

An additional reduction of 3,080 $MTCO_2e$ will be achieved through measures the City of Sebastopol has chosen. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent the actions that local communities can take directly. The communities have local control over their infrastructure and policies and have selected the local measures that best suit the needs of their community. The City intends to review the suite of measures with an eye towards expedited implementation of selected measures to achieve timely emission reductions.

The three measures that will have the greatest impact in Sebastopol are, in order of importance, Measure 2-L4 (Solar in Existing Non-Residential Buildings), Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009), and Measure 5-L2 (Carpool-Incentives & Ride-Sharing Program). These three measures, in addition to reducing GHG emissions, will save energy, improve air quality and public health in the City, and conserve water and other natural resources. As the county and state continue to experience a historic drought, water conservation will remain an especially important co-benefit.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the City. Of the regional measures, the measures with the greatest impact are the Community Choice Aggregation (CCA) measure, the waste-to-energy measure, and the waste diversion measure.

Table 5.7-5 presents the individual GHG reduction measures that Sebastopol has selected for the CAP. For more information on the specifics of each measure, see Appendix C.

### Table 5.7-5. Sebastopol 2020 GHG Emissions Reductions by Measure

| State and Regional Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **Goal 1: Increase Building Energy Efficiency** | **1,538** | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 531 | N/A |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 603 | N/A |
| Measure 1-S3: Industrial Boiler Efficiency | - | N/A |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 69 | N/A |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 335 | N/A |
| **Goal 2: Increase Renewable Energy Use** | **7,007** | |
| Measure 2-S1: Renewables Portfolio Standard | 5,619 | N/A |
| Measure 2-S2: Solar Water Heaters | 23 | N/A |
| Measure 2-R1: Community Choice Aggregation | 1,364 | N/A |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **977** | |
| Measure 5-R1: Improve and Increase Transit Service | 13 | N/A |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A |
| Measure 5-R4: Trip Reduction Ordinance | 195 | N/A |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A |
| Measure 5-R6: Reduced Transit Passes | 181 | N/A |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 144 | N/A |
| Measure 5-R8: Safe Routes to School | 444 | N/A |
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |

| State and Regional Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **11,969** | | |
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 11,074 | N/A | |
| Measure 6-S2: Advanced Clean Cars | 298 | N/A | |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 597 | N/A | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **526** | | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 139 | N/A | |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 386 | N/A | |
| **Goal 9: Increase Solid Waste Diversion** | **1,722** | | |
| Measure 9-R1: Waste Diversion Goal | 1,722 | N/A | |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **2,725** | | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 2,725 | N/A | |
| **Goal 11: Reduce Water Consumption** | | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | N/A | |
| **Goal 12: Increase Recycled Water and Greywater Use** | **< 1** | | |
| Measure 12-R1: Recycled Water* | < 1 | N/A | |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **21** | | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 7 | N/A | |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 14 | N/A | |
| **Local Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **33** | | |
| Measure 1-L2: Outdoor Lighting | 29 | 25% | of outdoor lighting to participate |

| State and Regional Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 1-L3: Shade Tree Planting | 4 | 400 | trees planted |
| **Goal 2: Increase Renewable Energy Use** | **1,712** | | |
| Measure 2-L1: Solar in New Residential Development | 26 | 100% | of new houses to participate |
| Measure 2-L2: Solar in Existing Residential Building | 248 | 15% | of existing homes with solar |
| Measure 2-L3: Solar in New Non-Residential Developments | 221 | 75% | of new non-residential development to participate |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 1,217 | 25% | of existing non-residential development with solar |
| **Goal 3: Switch Equipment from Fossil Fuel to Electricity** | **32** | | |
| Measure 3-L1: Convert to Electric Water Heating | 32 | 10% | of households |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **245** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 208 | 60% | of growth to result in mixed use |
| Measure 4-L2: Increase Transit Accessibility | 24 | 15% | of growth to be 25+ units |
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| Measure 4-L4: Affordable Housing Linked to Transit | 13 | 20% | of new development to be affordable |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **471** | | |
| Measure 5-L1: Local Transportation Demand Management Program | 144 | 38% | of employees eligible |
| Measure 5-L2: Carpool-Incentives & Ride-Sharing Program | 282 | 78% | of employees eligible |
| Measure 5-L3: Guaranteed Ride Home | NQ | Yes | |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 45 | 100% | of trips affected |
| Measure 5-L7: Supporting Parking Policy Measures | NQ | Yes | |

| State and Regional Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **42** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 3 | 5 | charging stations installed |
| Measure 7-L2: Electrify Construction Equipment | 38 | 10% | of equipment |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | NQ | Yes | |
| **Goal 8: Reduce Idling** | **9** | | |
| Measure 8-L1: Idling Ordinance | NQ | 2 | minutes below state law |
| Measure 8-L2: Idling Ordinance for Construction Equipment | 9 | 2 | minutes below state law |
| **Goal 9: Increase Solid Waste Diversion** | **< 1** | | |
| Measure 9-L1: Create Construction and Demolition Reuse and Recycling Ordinance | < 1 | 3% | beyond baseline |
| **Goal 11: Reduce Water Consumption** | **532** | | |
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 418 | 20% | Reduction in per capita water use |
| Measure 11-L2: Water Conservation for New Construction* | 4 | 100%/ 50% | % of new residential/ nonresidential development |
| Measure 11-L3: Water Conservation for Existing Buildings* | 110 | 25%/ 50% | % of new residential/ nonresidential development |
| **Goal 12: Increase Recycled Water and Greywater Use** | **3** | | |
| Measure 12-L1: Greywater Use | 3.23 | 25% | greywater goal |
| **State Measure Reductions in Sebastopol** | **18,880** | | |
| **Regional Measure Reductions in Sebastopol** | **7,600** | | |
| **Local Measure Reductions in Sebastopol** | **3,080** | | |
| **Grand Total Emissions Reductions in Sebastopol** | **29,560** | | |

*Measures reduce emissions from multiple sources (i.e. water and energy)

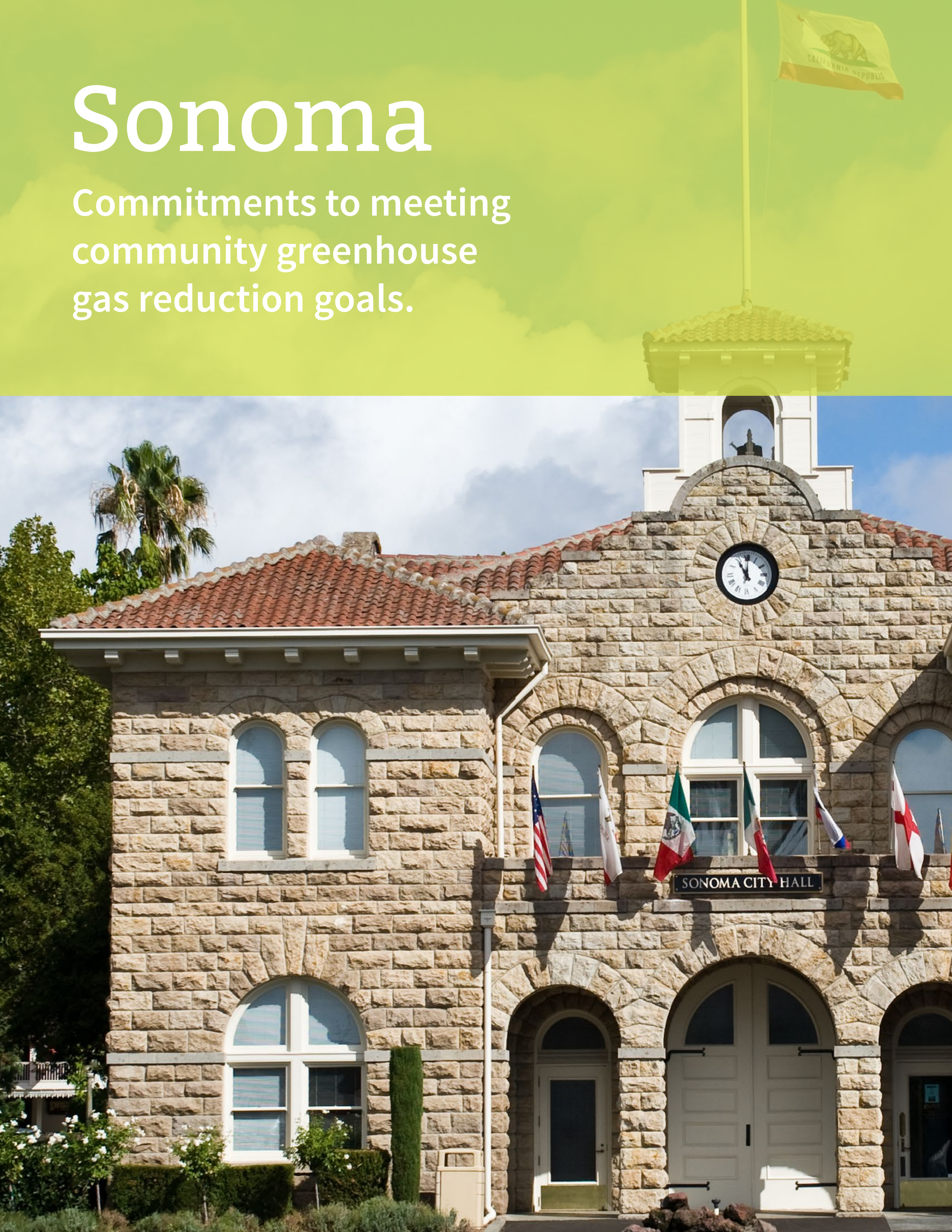
NQ = not quantified

### 5.7.5 Municipal Greenhouse Gas Reduction Measures

Like the other cities and the county, Sebastopol has recognized the need to reduce GHG emissions from municipal operations. The City has existing programs in place for green municipal buildings and alternative fuels for its municipal fleet. Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. Sebastopol and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# Sonoma

## Commitments to meeting community greenhouse gas reduction goals.


SONOMA CITY HALL

# 5.8 Sonoma

This section presents the community greenhouse gas (GHG) emissions profile specific to Sonoma and the measures that the City of Sonoma will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.8.1 Community Summary

The City of Sonoma is home to three of the first ten California Historical Landmarks, along with a number of other historic sites. Located in the heart of one of the world's premier wine producing regions, Sonoma is a working town with a rich cultural heritage. The adjacent scenic hills and agricultural valley provide a setting of unparalleled natural beauty. The San Francisco de Solano mission and other historic buildings that surround the central Plaza complement the area's viticultural prominence and visual beauty to make Sonoma a distinctive and successful tourism destination. The City serves as the economic hub for the rural Sonoma Valley, which has a population of about 39,000. Sonoma has typical Mediterranean weather with hot, dry summers and cool, wet winters. The City is located in the southeast portion of the county, west of Napa and east of Petaluma.

### Demographics

Sonoma spans 2.7 square miles and has largely residential, commercial, and agricultural land uses. The City had a population of 10,678 as of the 2010 census. In 2020 the population of Sonoma is expected to be 11,165, an increase of 5% over 2010. Employment in the area is expected to increase by 21%. Sonoma's demographic composition in 2010 was 87% White, 0.5% African American, 0.5% Native American, 3% Asian, 0.2% Pacific Islander, 7% from other races, and 2.5% from two or more races. Persons of Hispanic or Latino origin were 15%.

As shown in Table 5.8-1, the City is expected to experience relatively slow growth in population, housing, and jobs in the future.

**Table 5.8-1. Sonoma Socioeconomic Data**

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | 1990 | 2010 | 2015 | 2020 | 2040 | 2050 |
| Population | 8,121 | 10,648 | 11,009 | 11,165 | 11,692 | 11,964 |
| Housing | 3,866 | 5,060 | 5,123 | 5,196 | 5,441 | 5,568 |
| Employment | 4,937 | 5,746 | 6,350 | 6,954 | 7,978 | 8,178 |

Socioeconomic data were derived from the SCTA travel demand model and incorporate input from the City based on its internal planning forecasts.

According to the 2010 Census, City of Sonoma housing is majority owner-occupied with 59% of housing units owner-occupied and 41% rented.

## Energy and Water Use

Compared to households in the county as a whole, Sonoma households use less electricity but more natural gas and water. They also use less electricity, natural gas, and water than households statewide.

**Table 5.8-2. Sonoma, County, and State 2010 Average Energy and Water Use (per household, per year)**

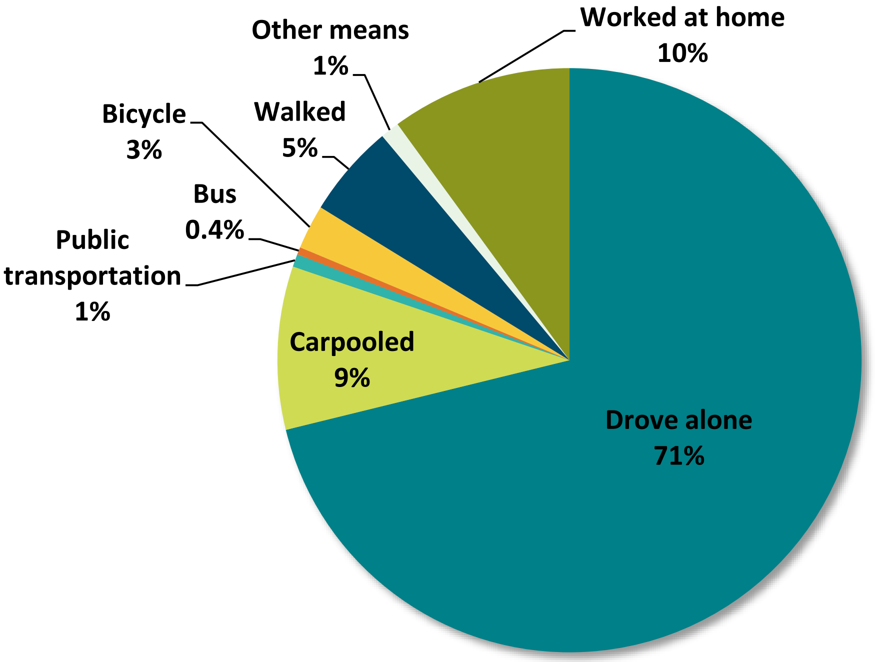
| | Sonoma | County | State |
|---|---|---|---|
| Electricity (kWh) | 5,997 | 7,042 | 9,320 |
| Natural Gas (Therms) | 483 | 413 | 512 |
| Water Use (Gallons) | 84,136 | 75,810 | 107,869 |

Sources:
City Data: provided by PG&E (energy) and by the City of Sonoma Urban Water Management Plan.
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In the inventory year 2010, most Sonoma residents (71%) drove alone to work, and about 9% carpooled. For many residents of Sonoma, alternative transportation options are not available for their commute trip. With the average trip to work for residents of Sonoma taking 25.5 minutes, and limited bus service, riding a bus is not a viable option for many City residents (U.S. Census Bureau 2014).

Figure 5.8-1. Modes to Work in Sonoma in 2010



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

## 5.8.2 Sonoma's Existing Actions to Reduce GHG Emissions

Sonoma has already taken a number of steps to reduce energy use, promote renewable energy use, and other actions that have been helping to reduce GHG emissions. Sonoma has adopted the following ordinances and General Plan policies that would also help to reduce GHG emissions and will support the implementation of the formal GHG reduction measures in this CAP.

- Building Energy
  - Residential Retrofits: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
  - Residential Appliance Upgrades: Programs through PG&E and other agencies.
  - Solar Installations at Residences: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
  - Solar Installations at businesses.
  - Standardized Permit Submittal for Residential PV Systems: In an effort to promote a consistent methodology of processing permits by all jurisdictions within the Redwood Empire Chapter of Code Officials, this standardized permit submittal has been developed for residential roof-mounted PV electrical systems of up to 5 kilowatts (kW).
  - Sonoma County Energy Independence Program (SCEIP): Enables residential and commercial property owners to access PACE financing for permanently installed energy or

    water improvements to their property. Under Energy Upgrade California, rebates are available for homeowners interested in doing energy retrofit improvements.

  - Sustainability Program – General Plan Implementation Measure: Chapter 3 – Measure 3.2.1 General Plan Goal: ER-3: Conserve natural resources to ensure their long-term sustainability. CAL Green Building Standards Code: Municipal Code Chapter 14.10.050. City adopts Tier 1 as mandatory for all new residential and non-residential buildings.
  - General Plan Policy 6.2: Implement Sonoma's Green Building Ordinance to ensure new development is energy and water efficient, and consider establishing additional incentives to achieve energy and water conservation efficiencies higher than those required by the Ordinance. Revise and/or revisit the ordinance as necessary to reflect the introduction of a State-wide green building code.
  - General Plan Policy 6.4: Promote the use of alternative energy sources such as solar energy, cogeneration, and non-fossil fuels.
  - The City offers a Business Improvement Matching Funds Loan Program for improvements to commercial buildings, including lighting retrofits, insulation and weatherization, energy management systems, HVAC system upgrades, water heating systems, irrigation efficiency systems, rainwater harvesting systems, low-flow toilets, and similar types of improvements to the building or property that have been identified through a qualified energy and/or water efficiency survey.
- Land Use and Transportation
  - Bicycle and Pedestrian Master Plan.
  - Mixed Use Development – General Plan Policy: Chapter 4 – Policy 3.2 General Plan Goal CE-3: Minimize vehicle trips while ensuring safe and convenient access to activity centers and maintaining Sonoma's small-town character.
  - General Plan Policy 3.2: Encourage a mixture of uses and higher densities where appropriate to improve the viability of transit and pedestrian and bicycle travel.
  - Increased Transit Service – General Plan Policy 3.3. Promote transit use and improve transit services.
  - General Plan Goal 6.0: Promote environmental sustainability through support of existing and new development which minimizes reliance on natural resources.
  - General Plan Policy 6.1: Preserve open space, watersheds, environmental habitats and agricultural lands, while accommodating new growth in compact forms that de-emphasizes the automobile.
  - General Plan Policy 6.5: Incorporate transportation alternatives such as walking, bicycling and, where possible, transit into the design of new development.
  - Idling Ordinance: Municipal Code 9.56.080 other limitations. A. Limitations on the Idling of Commercial Vehicles. When parked within 100 feet of a residential zoning district, a driver

of a commercial vehicle shall not cause or allow an engine to idle for more than five consecutive minutes, except as necessary for the loading or unloading of cargo within a period not to exceed 30 minutes.

  - General Plan Goal CE-2: Establish Sonoma as a place where bicycling is safe and convenient.
    - General Plan Policy 2.1: Promote bicycling as efficient alternative to driving.
    - General Plan Policy 2.2: Extend the bike path system, with a focus on establishing safe routes to popular destinations.
    - General Plan Policy 2.3: Expand availability of sheltered bicycle parking.
    - General Plan Policy 2.5: Incorporate bicycle facilities and amenities in new development.
  - General Plan Goal CE-3: Minimize vehicle trips while ensuring safe and convenient access to activity centers and maintaining Sonoma's small-town character.
    - General Plan Policy 3.2: Encourage a mixture of uses and higher densities where appropriate to improve the viability of transit and pedestrian and bicycle travel.
    - General Plan Policy 3.3: Promote transit use and improve transit services.
    - General Plan Policy 3.4: Encourage shared and "park once" parking arrangements that reduce vehicle use.
  - General Plan Goal CD-4: Encourage quality, variety, and innovation in new development.
    - General Plan Policy 4.4: Require pedestrian and bicycle access and amenities in all development.
- Waste Minimization and Recycling
  - Increase Waste Diversion in Municipal Facilities: Recycling is required in all City offices.
  - Compost Your Veggies Program: All vegetative food waste can be added to yard debris bins.
  - Commercial Composting Program. Collects waste from local restaurants and kitchens and converts to high organic soil from local gardens, farms, and vineyards
  - Pharmaceutical Drop-off Program: In partnership with the Sonoma County Water Agency, the City and local pharmacies have instituted a program in which residents may return unused pharmaceutical products as a means of diverting them from the sanitation system.
  - Waste Reduction Goal: General Plan Goal ER-3: Conserve natural resources to ensure their long-term sustainability.
  - General Plan Policy 3.1: Increase the conservation-effectiveness and cost-effectiveness of the solid waste source reduction program through expanded recycling and composting.

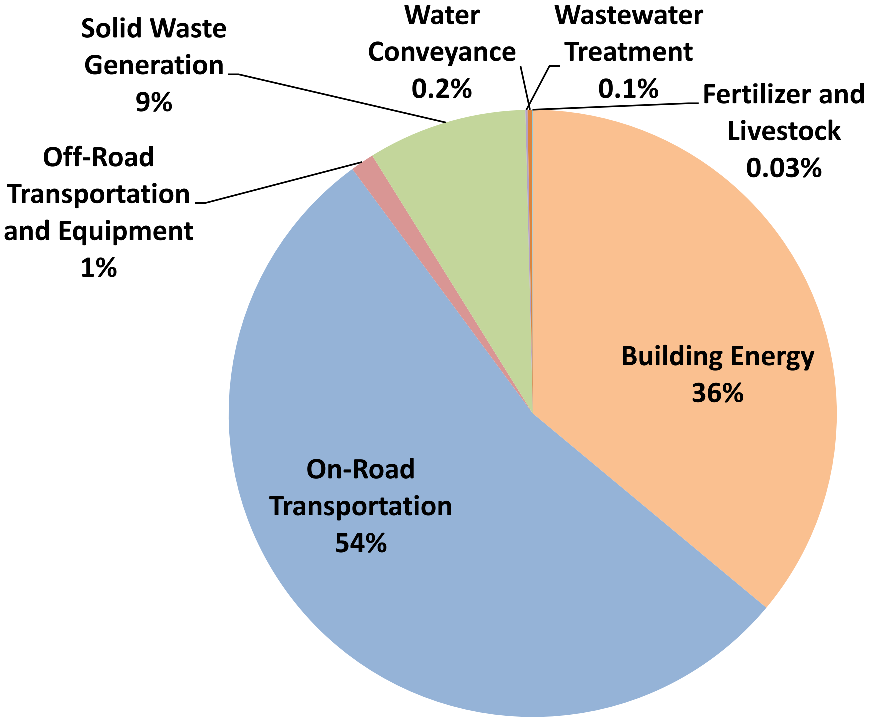
  - Polystyrene Food Packaging: Municipal Code Chapter 7.30. The purpose of this chapter is to decrease the use and presence of polystyrene products in order to promote the public health, reduce solid waste disposal and litter, protect air quality and the ozone layer, protect wildlife, livestock and the environment. The City council supports a ban on all uses of polystyrene not deemed absolutely critical.
  - Green Purchasing Policy: Municipal Code Chapter 3.04.060: In an effort to comply with the State of California Public Contract Code, the City recognizes the state guidelines referencing purchase of recycled products.
  - General Plan Goal ER-3: Conserve natural resources to ensure their long-term sustainability.
- Water and Wastewater Efficiency
  - General Plan Policy 6.3: Promote the use of sustainable construction techniques and environmentally sensitive design for all housing, to include best practices in water conservation. Low-impact drainage, and greenhouse gas reduction.
  - General Plan Implementation Measure 3.2.2: Continue to implement the Xeriscape Ordinance and update it as necessary to achieve water conservation objections.
  - Water Conservation Strategy – General Plan Implementation Measure: Chapter 3 – Measure 2.4.1, General Plan Goal ER-2: Identify, preserve, and enhance important habitat areas and significant environmental resources. Prepare and implement a comprehensive strategy for water conservation and the protection of water quality, including quantified objectives, with the goal of producing a Water Element for the General Plan.
  - General Plan Policy 2.4: Protect Sonoma Valley watershed resources, including surface and ground water supplies and quality.
  - General Plan Policy 6.6: Ensure sufficient water resources to serve existing and future residents provided for under Sonoma's 2020 General Plan: 1) take proactive steps to improve water conservation; 2) upgrade water supply infrastructure; 3) increase the local supply of water through new wells; 4) protect the quality and sustainability of groundwater resources; 5) investigate alternative water supply options.
  - Prior to the issuance of any building permit for new development, a water demand analysis, accompanied by a water conservation plan that targets CALGreen water standards, shall be submitted by the applicant and shall be subject to the review and approval of the City Engineer.
  - Water-Efficient Landscaping: Municipal Code Chapter 14.32: "This policy protects local water supplies through the implementation of a whole system approach to design, construction, installation and maintenance of the landscape resulting in water-conserving climate-appropriate landscapes, improved water quality and the minimization of natural resource inputs.

  - Water Shortage and Conservation Plan: Municipal Code Chapter 13.10: Regulations that enforce the conservation of water for the greatest public benefit with particular regard to public health, fire protection, and domestic use; to conserve water by reducing waste; and to achieve water use reductions in response to water shortages that occur from time to time. Includes voluntary measures and, when applicable by county council, mandatory measures.
  - Urban Water Management Plan: Resolution adopting the City of Sonoma 2010 Urban Water Management Plan.
  - The City has issued one building permit for a greywater system and one commercial development (Sonoma Valley Oaks) installed a greywater system.
  - Sustainability Workshops: The Sonoma Community Center has offered a number of sustainability workshops related to greywater, rainwater harvesting, recycling, gardening with native plants, and water conservation.
  - The City's Business Improvement Matching Funds Loan Program described above under "Building Energy" also supports water efficiency improvements on existing commercial buildings.
- Agriculture, Urban Forestry, and Natural Areas
  - General Plan Goal CD-1: Contain urban land uses within a compact area that preserves surrounding open space and agricultural resources.
  - General Plan Policy 1.4: Coordinate planning efforts with the County to protect adjacent agricultural land and open space.
  - General Plan Goal ER-1: Acquire and protect important open space in and around Sonoma.
  - General Plan Policy 1.3: Support community programs that preserve and promote agriculture.
  - Urban Growth Boundary: An Urban Growth Boundary (UGB) is established at the location shown on this General Plan's Land Use Plan map. The UGB is a line beyond which urban development will not be allowed, except for public parks, public schools, and uses consistent with the General Plan "Agriculture" land use designation as of February 25, 2000.
  - Tree Ordinance: Municipal Code Chapter 12.08: Regulations prohibiting unnecessary damage, removal, or destruction of trees.
  - Resource Conservation Strategy – General Plan Implementation Measure General Plan Goal ER-2: Conserve natural resources to ensure their long-term sustainability. General Plan Implementation Measure 3.3.1 Develop a sustainable resource conservation strategy for City facilities, services, and projects with quantifiable standards that serves as a model of green building and operation for the community.

- Natural Resource Conservation – General Plan Policy: Chapter 3 – Policy 3.2 General Plan Goal ER-3: Conserve natural resources to ensure their long-term sustainability. General Plan Policy 3.2: Encourage construction, building maintenance, landscaping, and transportation practices that promote energy and water conservation and reduce greenhouse gas emissions.
- General Plan Goal 6.0: Promote environmental sustainability through support of existing and new development which minimizes reliance on natural resources.
- General Plan Policy 3.2: Encourage construction, building maintenance, landscaping, and transportation practices that promote energy and water conservation and reduce greenhouse gas emissions.
- General Plan Implementation Measure 3.2.1: Implement a sustainability program that includes quantified objectives, standards and incentives for green construction and assistance to local businesses and agricultural operations to institute green practices for construction and land, energy, and water conservation.

### 5.8.3 Greenhouse Gas Inventory and Forecast

**Figure 5.8-2. Sonoma 2010 Community GHG Inventory by Source**



Sonoma’s inventory is similar to other cities in the county and state. The majority of the GHG emissions are from transportation due to fossil fuel combustion in personal and light-duty vehicles. The next largest source is building energy, which includes emissions related to energy used to heat the homes and businesses in Sonoma. Residential uses account for most (53%) of the building energy emissions in Sonoma. Commercial uses account for 47% of building energy emissions. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

In Sonoma, total GHG emissions generated by community activities in 2010 were 103,370 $MTCO_2e$, which is approximately 3% of countywide GHG emissions in the same year. This is a 7% increase from estimated 1990 emissions, which were 96,890 $MTCO_2e$. Table 5.8-3 shows the 1990 backcast, the 2010 inventory and business-as-usual (BAU) forecasts for 2015, 2020, 2040 and 2050 for the City of Sonoma.

## Table 5.8-3. Sonoma Community GHG Backcast, Inventory, Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 31,750 | 33% | 37,280 | 36% | 41,350 | 35% | 43,620 | 36% | 47,960 | 36% | 49,120 | 37% |
| On-road Transportation | 50,850 | 52% | 55,670 | 54% | 64,500 | 55% | 65,950 | 54% | 68,870 | 52% | 66,090 | 50% |
| Off-road Transportation and Equipment | 1,120 | 1% | 1,300 | 1% | 1,600 | 1% | 1,950 | 2% | 3,720 | 3% | 3,810 | 3% |
| Solid Waste | 10,110 | 10% | 8,750 | 8% | 9,490 | 8% | 10,180 | 8% | 11,410 | 9% | 11,690 | 9% |
| Wastewater Treatment | 90 | 0% | 120 | 0.1% | 120 | 0% | 120 | 0% | 130 | 0% | 130 | 0% |
| Water Conveyance | 2,970 | 3% | 250 | 0.2% | 330 | 0% | 340 | 0% | 380 | 0% | 390 | 0% |
| **Total** | **96,890** | **100%** | **103,370** | **100%** | **117,390** | **100%** | **122,170** | **100%** | **132,470** | **100%** | **131,240** | **100%** |
| **Per-Capita Emissions** | **11.9** | | **9.7** | | **10.7** | | **10.9** | | **11.3** | | **11.0** | |

### 5.8.4 Greenhouse Gas Reduction Goal and Measures

The City of Sonoma joins the other Sonoma County communities to support the regional GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 20 local GHG reduction measures. The City's GHG emissions under 2020 BAU conditions (in absence of state, regional, and local reduction measures) would be approximately 122,170 $MTCO_2e$. The City's local GHG reduction measures, in combination with state and regional measures, would reduce the City's GHG emissions in 2020 to 85,700 $MTCO_2e$, which would be a reduction of approximately 30% compared to 2020 BAU conditions. The City will achieve these reductions through reduction measures that are technologically feasible and cost-effective per AB 32 through a combination of state (63%), regional (33%), and local (4%) efforts. Per-capita reductions in Sonoma in 2020 would be 3.3 $MTCO_2e$ per person. With the reduction measures in CA2020, per-capita emissions in Sonoma will be 7.7 MTCO2e per person, a 36% reduction in per capita emissions compared to 1990.

**Table 5.8-4. Sonoma 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

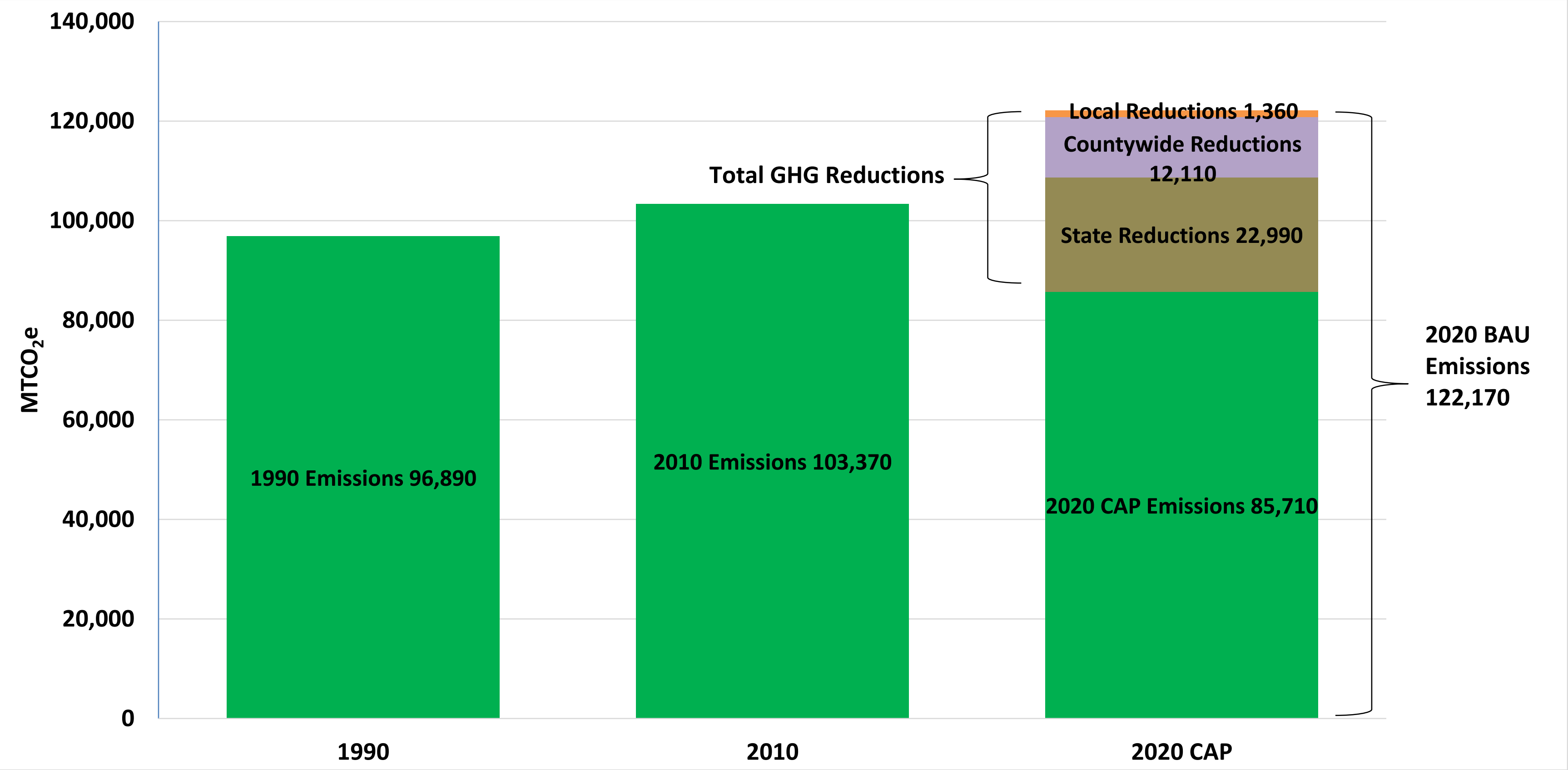
| Source | 2020 BAU Forecast | Reductions | | | | 2020 CAP Emissions | % Reduction From BAU |
|---|---|---|---|---|---|---|---|
| | | State | County-wide | Local | Total | | |
| Building Energy | 43,620 | 9,670 | 2,950 | 570 | 13,190 | 30,440 | 30% |
| On-Road Transportation | 65,950 | 13,140 | 1,640 | 50 | 14,820 | 51,120 | 22% |
| Off-Road Transportation and Equipment | 1,950 | 170 | - | 20 | 190 | 1,760 | 10% |
| Solid Waste | 10,180 | - | 7,200 | - | 7,200 | 2,980 | 71% |
| Water Conveyance | 340 | - | 310 | 730 | 1,040 | - [1] | 100% |
| Wastewater Treatment | 120 | - | 10 | - | 10 | 110 | 11% |
| **Total Emissions** | **122,170** | **22,990** | **12,110** | **1,360** | **36,460** | **85,700** | **30%** |
| | | **63%** | **33%** | **4%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures reduce improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.8-3 shows Sonoma's 1990 and 2010 GHG emissions total, 2020 BAU emissions forecast total, and the total emissions remaining after implementation of the City's reduction measures. The contribution of state, regional, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emissions reductions achieved in 2020. Like the other communities, Sonoma benefits greatly from the work the state and regional entities are committed to implementing on climate action. See Chapter 4 for more information on state and regional actions.

Figure 5.8-3. Sonoma 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions



## Greenhouse Gas Reduction Measures

As shown in Table 5.8-5, the City of Sonoma will achieve its reduction goal through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the City to comply with state mandates (e.g. Title 24 energy efficiency measures). State measure reductions total 22,990 $MTCO_2e$, which include the Pavley vehicle fuel efficiency standards, Title 24 building standards, the state's low carbon fuel standard, and the RPS, which will reduce GHG emissions from Sonoma's on-road and off-road transportation, and building energy use in 2020.

Regional measures will reduce emissions by 12,110 $MTCO_2e$ and will be implemented by regional entities, including the Regional Climate Protection Authority (RCPA), Sonoma County Water Agency (SCWA), County of Sonoma Energy Independence Office (ESD), Sonoma County Transportation Authority (SCTA), and Sonoma Clean Power (SCP).

An additional reduction of 1,360 $MTCO_2e$ will be achieved through local measures. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent the actions that local communities can take directly. The communities have local control over their infrastructure and policies and have selected the local measures that best suit the needs of their community.

The three measures that will have the greatest impact in Sonoma are, in order of importance, Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009), and Measure 11-L3 (Water Conservation for Existing Buildings), Measure 2-L2 (Solar in Existing Residential Buildings). These three measures, in addition to reducing GHG emissions, will save energy, improve air quality and public health in the region, and conserve water and other natural resources. As the county and state continue to experience a historic drought, water conservation will remain an especially important co-benefit.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the City. Of the regional measures, the measures with the greatest impact are the Community Choice Aggregation (CCA) measure, the waste-to-energy measure, and the waste diversion measure.

Table 5.8-5 presents the individual GHG reduction measures that Sonoma has selected for the CAP.

**City of Sonoma Electric Municipal Vehicle Fleet**

Along with the other communities in the county, the City of Sonoma joined the Sonoma County Local Government Electric Vehicle (EV) Partnership to collaborate as a region on the implementation of EVs and EV charging infrastructure. Purchasing electric vehicles for the City's municipal vehicle fleet, and constructing vehicle charging infrastructure will help the City reduce its municipal operations GHG emissions.

### Table 5.8-5. Sonoma 2020 GHG Emissions Reductions by Measure

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **State and Regional Measures** | | |
| **Goal 1: Increase Building Energy Efficiency** | **2,173** | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 741 | N/A |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 901 | N/A |
| Measure 1-S3: Industrial Boiler Efficiency | - | N/A |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 39 | N/A |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 493 | N/A |
| **Goal 2: Increase Renewable Energy Use** | **10,446** | |
| Measure 2-S1: Renewables Portfolio Standard | 7,998 | N/A |
| Measure 2-S2: Solar Water Heaters | 34 | N/A |
| Measure 2-R1: Community Choice Aggregation | 2,415 | N/A |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **1,207** | |
| Measure 5-R1: Improve and Increase Transit Service | < 1 | N/A |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A |
| Measure 5-R4: Trip Reduction Ordinance | 239 | N/A |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A |
| Measure 5-R6: Reduced Transit Passes | 221 | N/A |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 177 | N/A |
| Measure 5-R8: Safe Routes to School | 572 | N/A |
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **13,140** | |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 12,097 | N/A | |
| Measure 6-S2: Advanced Clean Cars | 288 | N/A | |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 755 | N/A | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **604** | | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 173 | N/A | |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 431 | N/A | |
| **Goal 9: Increase Solid Waste Diversion** | **3,012** | | |
| Measure 9-R1: Waste Diversion Goal | 3,012 | N/A | |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **4,190** | | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 4,190 | N/A | |
| **Goal 11: Reduce Water Consumption** | | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | N/A | |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **16** | | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 2 | N/A | |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 14 | N/A | |
| **Goal 14: Increase Use of Renewable Energy in Water and Wastewater Systems** | **310** | | |
| Measure 14-R1: Sonoma County Water Agency Carbon Free Water by 2015 | 310 | N/A | |
| **Local Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **173** | | |
| Measure 1-L2: Outdoor Lighting | 172 | 80% | of outdoor lighting to participate |
| Measure 1-L3: Shade Tree Planting | 1 | 50 | trees planted |

| **State, Regional, and Local Measures** | **2020 GHG Reductions** | **Participation Rate** | |
|---|---|---|---|
| **Goal 2: Increase Renewable Energy Use** | **394** | | |
| Measure 2-L1: Solar in New Residential Development | 2 | 8% | of new houses to participate |
| Measure 2-L2: Solar in Existing Residential Building | 245 | 11% | of existing homes with solar |
| Measure 2-L3: Solar in New Non-Residential Developments | 7 | 2% | of new non-residential development to participate |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 141 | 2% | of existing non-residential development with solar |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **18** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 16 | 50% | of growth to result in mixed use |
| Measure 4-L2: Increase Transit Accessibility | 2 | 15% | of growth to be 25+ units |
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| Measure 4-L4: Affordable Housing Linked to Transit | 1 | 20% | of new development to be affordable |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **26** | | |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 26 | 80% | of trips affected |
| Measure 5-L7: Supporting Parking Policy Measures | NQ | Yes | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **24** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 2 | 3 | charging stations installed |
| Measure 7-L2: Electrify Construction Equipment | 22 | 5% | of equipment |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | NQ | Yes | |
| **Goal 8: Reduce Idling** | | | |
| Measure 8-L1: Idling Ordinance | NQ | 2 | minutes below state law |
| **Goal 11: Reduce Water Consumption** | **729** | | |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 436 | 10% | Reduction in per capita water use |
| Measure 11-L2: Water Conservation for New Construction* | 16 | 50%/<br>50% | % of new residential/ nonresidential development |
| Measure 11-L3: Water Conservation for Existing Buildings* | 278 | 25%/<br>10% | % of new residential/ nonresidential development |
| **Goal 12: Increase Recycled Water and Greywater Use** | **< 1** | | |
| Measure 12-L1: Greywater Use | < 1 | 2% | greywater goal |
| **State Measure Reductions in Sonoma** | **22,990** | | |
| **Regional Measure Reductions in Sonoma** | **12,110** | | |
| **Local Measure Reductions in Sonoma** | **1,360** | | |
| **Grand Total Emissions Reductions in Sonoma** | **36,460** | | |

*Measures reduce emissions from multiple sources (i.e. water and energy)

NQ = not quantified

### 5.8.5 Municipal Greenhouse Gas Reduction Measures

Like the other cities and the county, Sonoma has recognized the need to reduce GHG emissions from municipal operations. The City has an existing program for using alternative fuels for its municipal fleet. Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. Sonoma and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# Windsor

## Commitments to meeting community greenhouse gas reduction goals.

# 5.9 Windsor

This section presents the community greenhouse gas (GHG) emissions profile specific to Windsor and the measures that the Town of Windsor will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.9.1 Community Summary

The Town of Windsor is a family-oriented community with a diverse population, a robust economy, and strong ties to the surrounding Sonoma County wine country and nearby Russian River recreation areas. Windsor follows the “Smart Growth” model for development that favors a mix of land uses, walkable neighborhoods, compact building design, transportation choices, distinctive architecture, and a strong sense of community. Visitors to Windsor appreciate its small-town character, comfortable and welcoming pace, downhome atmosphere, and quality shopping, restaurants, summer concerts, special events, and public spaces. Windsor residents enjoy excellent educational, recreational, civic, and cultural facilities and services, including the award-winning Town Green, Keiser Community Park, and Foothill Regional Park. The Town values its cultural diversity and promotes opportunities for all residents to share their unique heritage and engage in the life of the community.

Windsor embraces the concept of sustainability and supports efforts to increase the resilience of its residents and businesses in response to the environmental, social, and economic effects of changing climate conditions. The Town promotes energy efficiency and the use of renewable energy and is recognized as a leader in water conservation and the use of recycled water. The Town consistently follows prudent fiscal policies and practices to ensure sufficient resources in times of economic downturn or other challenges. The location and timing of new development in Windsor is carefully managed in order to maximize community benefits and minimize the impact of development on existing infrastructure, public services, and the Town’s fiscal well-being. The Town’s voter-approved Urban Growth Boundary is intended to retain the Town’s small size, manage new growth and development, and maintain its rural surroundings.

### Demographics

Windsor spans 7.3 square miles and has largely residential and commercial land uses. The Town had a population of 26,801 as of the 2010 census. In 2020 the population is expected to be 28,190, an increase of 5% over 2010. Employment in the area is expected to increase by 15%. Windsor’s demographic composition in 2010 was 74% White, 0.8% African American, 2% Native American, 3% Asian, 0.2% Pacific Islander, 15% from other races, and 5% from two or more races. Persons of Hispanic or Latino origin were 32%. According to the 2010 Census data, the Town of Windsor is majority owner-occupied with only 24% of all housing units occupied by renters. This is the lowest percentage of renters in the county. Windsor’s current average household income is the highest in the county, and in terms of age demographics, its population is the youngest.

As shown in Table 5.9-1, the Town is expected to experience steady growth in population, housing, and jobs in the future.

**Table 5.9-1. Windsor Socioeconomic Data**

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | 1990 | 2010 | 2015 | 2020 | 2040 | 2050 |
| Population | 13,371 | 26,801 | 27,295 | 28,190 | 32,663 | 34,167 |
| Housing | 4,912 | 8,970 | 9,418 | 9,828 | 11,435 | 11,949 |
| Employment | 4,898 | 8,963 | 9,609 | 10,283 | 11,280 | 11,626 |

Socioeconomic data were derived from the SCTA travel demand model and incorporate input from the Town based on its internal planning forecasts.

## Energy and Water Use

Compared to households in the county as a whole, Windsor households use more electricity, natural gas, and water. This may be due to larger household sizes and a greater percentage of households with children. However, Windsor households use less electricity, natural gas, and water than households statewide.

**Table 5.9-2. Windsor, County, and State 2010 Average Energy and Water Use (per household, per year)**

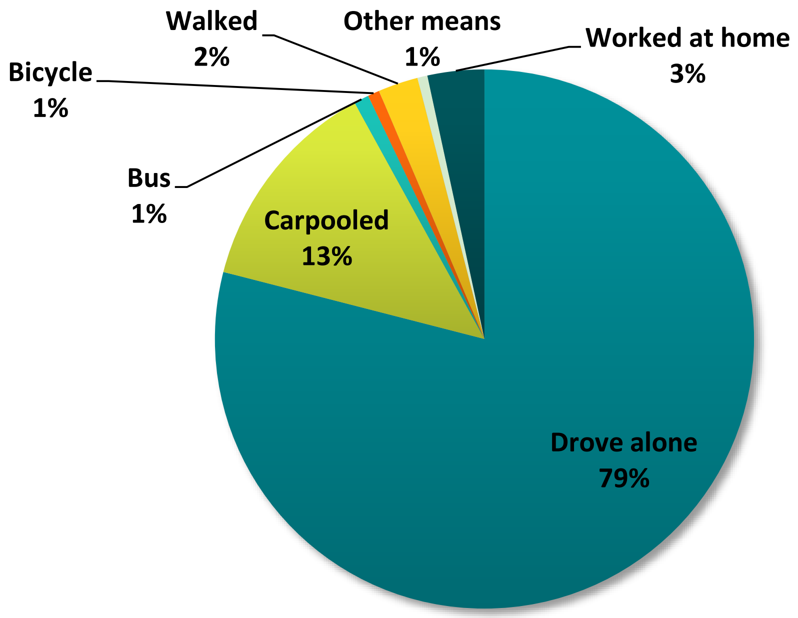
| | Windsor | County | State |
|---|---|---|---|
| Electricity (kWh) | 7,145 | 7,042 | 9,320 |
| Natural Gas (Therms) | 503 | 413 | 512 |
| Water Use (Gallons) | 86,862 | 75,810 | 107,869 |

Sources:
Town Data: provided by PG&E (energy) and by the Town of Windsor Urban Water Management Plan.
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In inventory year 2010, most Windsor residents (79%) drove alone to work, with 13% carpooling. With the average trip to work for residents of Windsor taking 23.5 minutes and limited bus service, riding a bus is not a viable option for many Windsor residents (U.S. Census Bureau 2014).

**Figure 5.9-1. Modes to Work in Windsor in 2010**



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

## 5.9.2 Windsor's Existing Actions to Reduce GHG Emissions

Windsor has already taken a number of steps to reduce energy use, promote renewable energy use, and other actions that have been helping to reduce GHG emissions. The Town has adopted the following ordinances and General Plan policies that also help to reduce GHG emissions and will support the implementation of the formal GHG reduction measures in this CAP.

- Building Energy
    - Residential Retrofits: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
    - Residential Appliance Upgrades: Windsor Efficiency Pay-As-You-Save (PAYS®) program for water saving retrofit projects and appliances replacement. Also included as an implementation program in the Town's 2015 General Plan Housing Element.
    - Solar Installations at Residences: Energy Upgrade California in Sonoma County – Whole House Upgrade Program.
    - Energy Conservation Measures – General Plan Policy: Chapter 6 (Energy) - H.1.6. Energy conservation measures such as insulation and weather stripping should be encouraged in existing structures through public education and financial assistance to low- and moderate-income families. General Plan Housing Element Policy 8.3 provides similar encouragement for residential buildings.

  - Solar Access – General Plan Policy: Chapter 6 (Energy) – Policy H.1.2. New residential and non-residential development should provide for solar access and encourage the use of solar easements.
  - Passive Heating and Cooling – General Plan Policy: Chapter 6 (Energy) – Policy H.1.4. New residential and subdivision developments should be required to consider opportunities for passive heating and cooling.
  - CALGreen Building Standards Code: Title VII, Chapter 2, Article 11. Tier 1 measures for residential and non-residential structures adopted as mandatory. General Plan Housing Element Policy 8.1 contains similar policy language and also refers to the Town's Green Building Ordinance.
  - Energy Conservation Promotion – General Plan Policy: Chapter 6 (Air Quality) – Policy G.2.6. Promote energy conservation/efficiency programs.
  - Resolution authorizing the Town's participation in the Sonoma County Energy Independence Program and other PACE financing programs.
  - Ordinance No. 2013-279: Authorization of the Implementation of a Community Choice Aggregation Program, Sonoma Clean Power (SCP).
- Land Use and Transportation
  - Bicycle and Pedestrian Master Plan.
  - Urban Growth Boundary – General Plan Policy: Chapter 4 (Community Development Pattern) – Policy B.1. Establish and Urban Growth Boundary with sufficient land to accommodate the Town's growth for the next 20 years.
  - Transit Oriented Development: The Town adopted the Station Area/Downtown Specific Plan in 2012. The plan increases densities within a 1/4 of the intermodal center.
  - Transit Oriented Development – General Plan Housing Element Policy 8.5. The Town shall encourage residential development in proximity to the Sonoma-Marin Area Rail Transit (SMART) Station, consistent with the Windsor Station/Downtown Specific Plan, to reduce vehicle miles traveled and promote transit ridership.
  - Complete Streets - General Plan: Chapter 4 (Transportation) – Policy D.3.2. The Town shall consider the needs of transit riders, pedestrians, people in wheelchairs, cyclists, and others in long-range planning and street design.
  - Mixed Land Use – General Plan: Chapter 4 (Transportation) - Policy D.5.2. The Town should encourage higher density mixed land uses within walking distances of existing and future transit stops.
  - Land Use and Circulation – General Plan Policy: Chapter 6 (Energy) – Policy H.1.1. The Town should promote land use patterns that reduce operational energy requirements especially for transportation purposes.

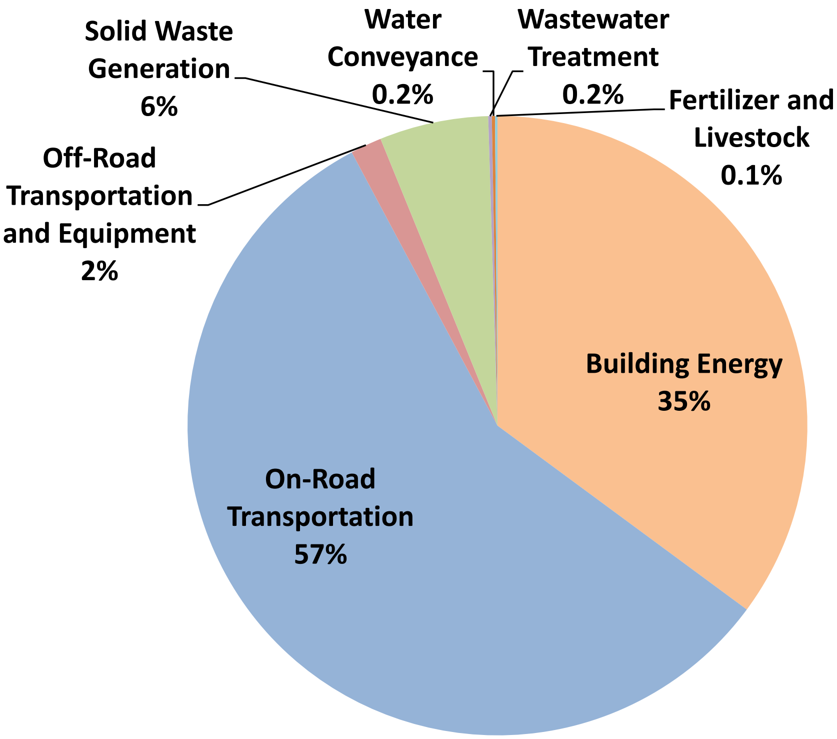
  - Housing Element – General Plan Housing Element (Opportunities for Water Conservation) - Policy 8.1. The Town shall establish a development pattern that helps reduce vehicle miles traveled and promotes transit ridership, and pedestrian and bicycle access.
  - Increased Transit Infrastructure – General Plan: Chapter 4 (Transportation) - Policy D.5.4. The Town shall require developers to construct, when appropriate, transit facilities including bus turnouts shelters and benches.
  - Commitment to Increased Transit Service – General Plan Policy D.5.3. The Town should support expansion of local bus service, and should continue to provide paratransit services to qualified users.
  - Carpooling – General Plan Policy: Chapter 6 (Air Quality) – Policy G.2.5. The Town should support and participate in regional carpooling, vanpooling, and other high occupancy vehicle efforts.
  - Trip Reduction Ordinance: Municipal Code Title IV – Chapter 4. Employers within the Town with one hundred (100) or more employees at an individual job site shall disseminate trip reduction information regarding transportation alternatives including carpools, vanpools, transit and bicycling and other methods of reducing trips such as telecommuting, compressed work week and flexible work hours annually to each employee and to all new employees as they are hired.
  - Energy Conservation Development Incentives – General Plan Program: Chapter 6 (Energy) – Implementation Program H.1. The Town shall consider reducing automobile parking area requirements for new developments in exchange for owner-supplied transit, in-lieu fee payments for public transit, vegetation that shades bike routes and parking lots in the summer, and other amenities.
  - Installed public electric vehicle (EV) charging stations.
  - Green Purchasing – General Plan Program: Chapter 6 – Implementation Program H.6. The Town should purchase energy-efficient automobiles and other equipment.
- Water and Wastewater Efficiency
  - Wastewater Methane Capture: The Town's ongoing Modernization Study is evaluating a number of aspects of the treatment plant processes, including solids handling, and a review of potential methane capture may be included as part of the Study.
  - Water Fixture Retrofits (Windsor Pay-As-You-Save Program). On-bill water financing and retrofits.
  - Increase Waste Diversion in Municipal Facilities: The minimum required diversion rate in the Exclusive Franchise agreement is 45%. The minimum diversion rates in the Non-exclusive Franchise agreements (C&D debris) is 60% to 65%, depending on the franchisee.
  - Recycled Water: The Town has an extensive system of recycled water use, concentrated in the west side of Windsor.

  - Water Conservation Techniques – General Plan Policy: Chapter 6 (Water Resources and Quality) – Policy C.1.2. Encourage water conservation through measures such as low-flow and low-flush toilets and showers, drought resistant landscaping, and using recycled water.
  - Water Efficient Landscape Ordinance: Municipal Code Title XII, Chapter 3, Article 9. Creates provisions for the design, construction, installation and maintenance of the landscape resulting in water conserving climate-appropriate landscapes, improved water quality and the minimization of natural resource inputs.
  - Conservation of Water Supply: Municipal Code Title XII, Chapter 3, Article 8. Ordinance relates to the suspension of new connections to the Town's water system, waste of water prohibited, prohibition of non-essential use of water, and conditional use of sprinklers.
  - Water Resources and Quality – General Plan: Chapter 6 (Water Resources and Quality) – Policy C.1. Protect and manage the Town's surface water and groundwater resources to meet the needs of Windsor.
- Agriculture, Urban Forestry and Natural Areas
  - Open Space Preservation – General Plan Policy: Chapter 6 (Open Space) – Policy A.1. Preserve open space land for commercial agricultural and productive uses, the protection and use of natural resources, the enjoyment of scenic beauty and recreation, and protection from natural hazards.
  - Agricultural Perpetuity – General Plan Policy: Chapter 6 (Agricultural Lands) – Policy B.1.1. The Town shall encourage the County to preserve agricultural activities on state-designated important farmlands and on prime soils outside the Urban Growth Boundary in recognition that prime agricultural land (defined as Class I and II soils by the U.S. Soil Conservation Service) is an irreplaceable natural resource. Town's Zoning Ordinance (Chapter 27.24: Agricultural Preservation) requires agricultural buffers.
  - Legal Mechanisms for Open Space Protection – General Plan Policy: Chapter 6 (Open Space) – Policy A.1.7. Employ actions such as land acquisition, conservation easements, dedications and property owner/developer exactions, and impact mitigations to protect open space.
  - Resource Preservation – General Plan Policy: Chapter 6 (Open Space) – Policy A.1.2. Encourage the preservation of oak woodlands, productive farmlands, riparian corridors, and visually prominent hillsides and ridgelines.
  - Clustering Development – General Plan: Chapter 6 (Open Space) Policy A.1.2: The Town shall encourage the preservation of sensitive environmental resource areas, such as oak woodlands, productive farmlands, riparian (creekside) corridors, and visually prominent hillsides and ridgelines through measures such as clustering development and conservation easements. Town's Zoning Ordinance (Section 27.20.040: Creekside Development) requires setbacks and regulates development along creeks.

- Trees – General Plan Program: Chapter 6 (Biological Resources) – Implementation Program D.3. Develop regulations to define and protect oaks and heritage trees to be incorporated into the existing regulations. The Town has adopted Zoning Ordinance Chapter 27.36: Tree Preservation and Protection to implement this policy.

### 5.9.3 Greenhouse Gas Inventory and Forecast

**Figure 5.9-2. Windsor 2010 Community GHG Inventory by Source**



Windsor's inventory is similar to other cities in the county and state. The majority of the GHG emissions are from transportation due to fossil fuel combustion in personal and light-duty vehicles. The next largest source is building energy, which includes emissions related to energy used to heat the homes and business in Windsor. Residential uses account for most (69%) of the building energy emissions in Windsor. Commercial uses account for 31% of building energy emissions. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

Total GHG emissions generated by community activities in 2010 were 157,830 MTCO$_2$e, which is approximately 4% of countywide GHG emissions in the same year. This is a 19% increase from estimated 1990 emissions, which were 133,000 MTCO$_2$e. This is due to the socioeconomic growth experienced in the Town. Between 1990 and 2010, the Town experienced substantial growth. Population in the Town doubled, and the number of houses and jobs nearly doubled. Table 5.9-3 shows the 1990 backcast, the 2010 inventory and business-as-usual (BAU) forecasts for 2015, 2020, 2040 and 2050 for the Town of Windsor.

### Table 5.9-3. Windsor Community GHG Backcast, Inventory, and BAU Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 34,600 | 26% | 55,500 | 35% | 61,450 | 34% | 64,640 | 34% | 73,760 | 35% | 76,740 | 35% |
| On-Road Transportation | 77,700 | 58% | 90,210 | 57% | 103,730 | 58% | 109,250 | 58% | 119,140 | 56% | 119,910 | 55% |
| Off-Road Transportation and Equipment | 1,400 | 1% | 2,580 | 2% | 3,060 | 2% | 3,660 | 2% | 7,100 | 3% | 7,380 | 3% |
| Solid Waste | 17,150 | 13% | 8,980 | 6% | 9,330 | 5% | 9,780 | 5% | 11,080 | 5% | 11,520 | 5% |
| Wastewater Treatment | 150 | 0% | 290 | 0.2% | 300 | 0% | 310 | 0% | 360 | 0% | 370 | 0% |
| Water Conveyance | 1,990 | 1% | 260 | 0.2% | 440 | 0% | 470 | 0% | 570 | 0% | 590 | 0% |
| **Total** | **133,000** | **100%** | **157,830** | **100%** | **178,300** | **100%** | **188,120** | **100%** | **212,010** | **100%** | **216,520** | **100%** |
| **Per-Capita Emissions** | **9.9** | | **5.9** | | **6.5** | | **6.7** | | **6.5** | | **6.3** | |

## 5.9.4 Greenhouse Gas Reduction Goal and Measures

The Town of Windsor joins the other Sonoma County communities to support the regional GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 21 local GHG reduction measures. The Town's GHG emissions under 2020 BAU conditions (in absence of state, regional, and local reduction measures) would be approximately 188,120 $MTCO_2e$. The Town's local GHG reduction measures, in combination with state and regional measures, would reduce the Town's GHG emissions in 2020 to 127,720 $MTCO_2e$, which would be a reduction of approximately 32% compared to 2020 BAU conditions. The Town will achieve these reductions through reduction measures that are technologically feasible and cost-effective per AB 32 through a combination of state (66%), regional (26%), and local (8%) efforts. With the reduction measures in CA2020, per-capita emissions in Windsor will be 4.5 MTCO2e per person, a 54% reduction in per capita emissions compared to 1990.

**Table 5.9-4. Windsor 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

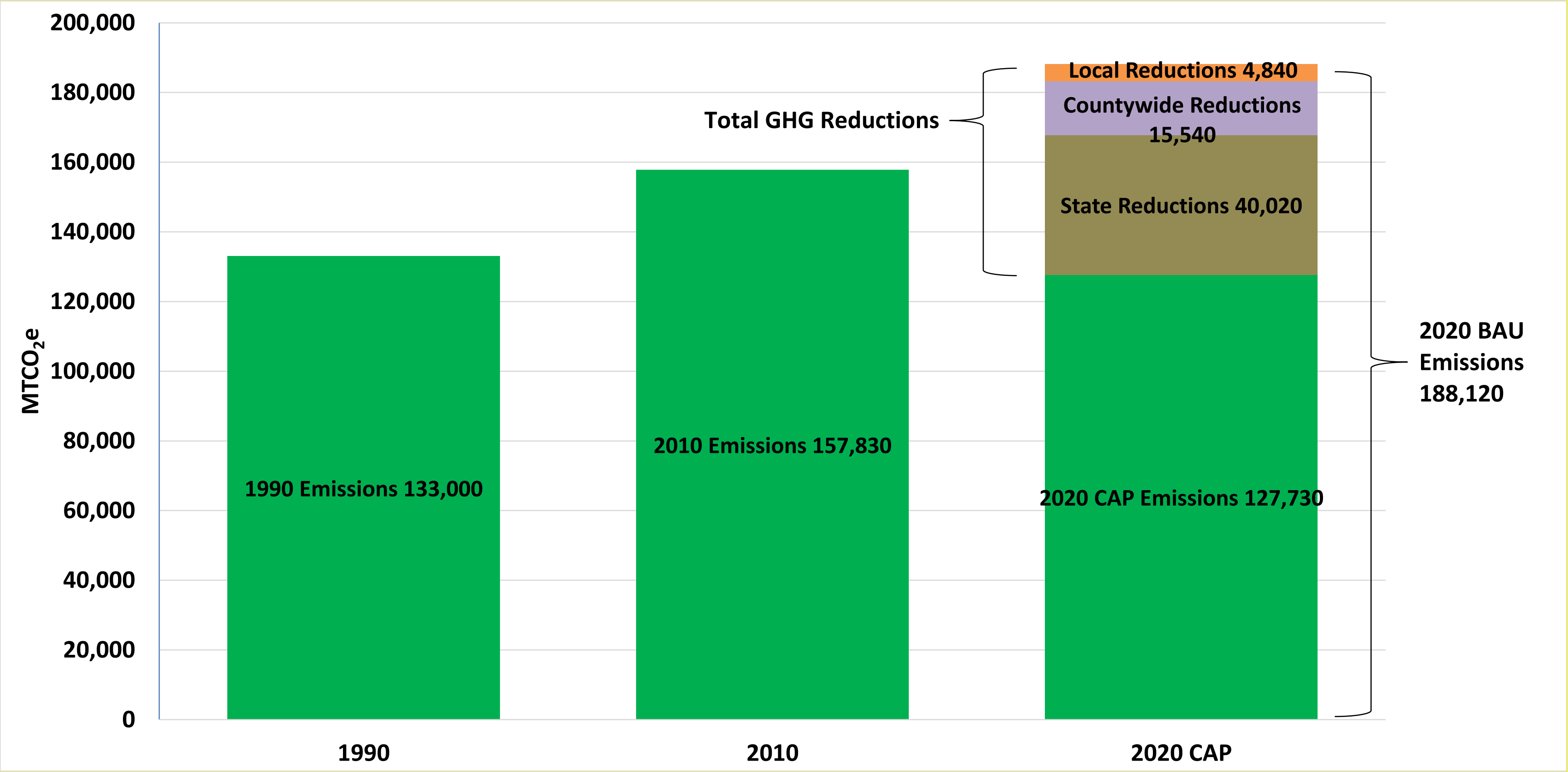
| Source | 2020 BAU Forecast | Reductions | | | | 2020 CAP Emissions | % Reduction from BAU |
|---|---|---|---|---|---|---|---|
| | | State | County-wide | Local | Total | | |
| Building Energy | 64,640 | 14,160 | 4,270 | 3,010 | 21,440 | 43,200 | 33% |
| On-Road Transportation | 109,250 | 25,530 | 2,950 | 430 | 28,900 | 80,350 | 26% |
| Off-Road Transportation and Equipment | 3,660 | 320 | - | 30 | 360 | 3,310 | 10% |
| Solid Waste | 9,780 | - | 7,830 | - | 7,830 | 1,950 | 80% |
| Water Conveyance | 470 | - | 440 | 1,370 | 1,810 | - [1] | 100% |
| Wastewater Treatment | 310 | - | 60 | - | 60 | 250 | 19% |
| **Total Emissions** | **188,120** | **40,020** | **15,540** | **4,840** | **60,390** | **127,720** | **32%** |
| | | **66%** | **26%** | **8%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures reduce improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.9-3 shows Windsor's 1990 and 2010 GHG emissions total, 2020 BAU emissions forecast total, and the total emissions remaining after implementation of the Town's reduction measures. The contribution of state, regional, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emissions reductions achieved in 2020. Like the other communities, Windsor benefits greatly from the work the state and regional entities are committed to implementing on climate action See Chapter 3 for more information on state and regional actions.

Figure 5.9-3. Windsor 1990, 2010, and 2020 GHG Emissions; 2020 State, Regional, and Local Reductions



## Greenhouse Gas Reduction Measures by Source

As shown in Table 5.9-5, the Town of Windsor will achieve its reduction goal through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the Town to comply with state mandates (e.g., Title 24 energy efficiency measures). State measure reductions total 40,020 $MTCO_2e$, which include the Pavley vehicle fuel efficiency standards, Title 24 building standards, the state's low carbon fuel standard, and the RPS, which will reduce GHG emissions from Windsor's on-road and off-road transportation, and building energy use in 2020.

Regional measures will reduce emissions by 15,540 $MTCO_2e$ and will be implemented by regional entities, including the Regional Climate Protection Authority (RCPA), Sonoma County Water Agency (SCWA), County of Sonoma Energy Independence Office (ESD), Sonoma County Transportation Authority (SCTA), and Sonoma Clean Power (SCP).

An additional reduction of 4,840 $MTCO_2e$ will be achieved through local measures. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent the actions that local communities can take directly. The communities have local control over their infrastructure and policies and have selected the local measures that best suit the needs of their community.

The three measures that will have the greatest impact in Windsor are, in order of importance, Measure 2-L4 (Solar in Existing Non-Residential Buildings), Measure 2-L2 (Solar in Existing Residential Buildings), and Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009). These three measures, in addition to reducing GHG emissions, will provide co-benefits that save energy, reduce utility costs, improve air quality and public health in the region, and conserve water and other natural resources. As the county and state continue to experience a historic drought, water conservation will remain an especially important co-benefit.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the Town. Of the regional measures, the measures with the greatest impact include the Community Choice Aggregation (CCA) measure, the waste-to-energy measure, and the waste diversion measure.

Table 5.9-5 presents the individual GHG reduction measures that Windsor has selected for the CAP. For more information on the specifics of each measure, see Appendix C.

**Windsor High School Sustainability**

Windsor High School has become a model of sustainability, with significant help from the Town. The high school practices aggressive recycling, water conservation, energy efficiency, and uses alternative fuels in school buses. The Town has helped and encouraged the high school to adopt these practices by offering free waste disposal in exchange for the school strongly emphasizing recycling to students, and by providing recycled water at no cost to the school for landscape irrigation and toilet flushing.

### Table 5.9-5. Windsor 2020 GHG Emissions Reductions by Measure

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **State and Regional Measures** | | |
| **Goal 1: Increase Building Energy Efficiency** | **3,699** | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 1,086 | N/A |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 1,357 | N/A |
| Measure 1-S3: Industrial Boiler Efficiency | - | N/A |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 347 | N/A |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 909 | N/A |
| **Goal 2: Increase Renewable Energy Use** | **14,729** | |
| Measure 2-S1: Renewables Portfolio Standard | 11,656 | N/A |
| Measure 2-S2: Solar Water Heaters | 64 | N/A |
| Measure 2-R1: Community Choice Aggregation | 3,010 | N/A |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **2,158** | |
| Measure 5-R1: Improve and Increase Transit Service | 19 | N/A |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A |
| Measure 5-R4: Trip Reduction Ordinance | 412 | N/A |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A |
| Measure 5-R6: Reduced Transit Passes | 381 | N/A |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 305 | N/A |
| Measure 5-R8: Safe Routes to School | 1,041 | N/A |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **25,532** | |
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 23,793 | N/A |
| Measure 6-S2: Advanced Clean Cars | 756 | N/A |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 982 | N/A |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **1,111** | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 324 | N/A |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 787 | N/A |
| **Goal 9: Increase Solid Waste Diversion** | **2,893** | |
| Measure 9-R1: Waste Diversion Goal | 2,893 | N/A |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **4,935** | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 4,935 | N/A |
| **Goal 11: Reduce Water Consumption** | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | N/A |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **59** | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 1 | N/A |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 58 | N/A |
| **Goal 14: Increase Use of Renewable Energy in Water and Wastewater Systems** | **438** | |
| Measure 14-R1: Sonoma County Water Agency Carbon Free Water by 2015 | 438 | N/A |

| **State, Regional, and Local Measures** | **2020 GHG Reductions** | **Participation Rate** | |
|---|---|---|---|
| **Local Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **135** | | |
| Measure 1-L1: Expand the Green Building Ordinance Energy Code | 62 | 10 | points beyond Title 24 |
| Measure 1-L2: Outdoor Lighting | 68 | 25% | of outdoor lighting to participate |
| Measure 1-L3: Shade Tree Planting | 5 | 500 | trees planted |
| **Goal 2: Increase Renewable Energy Use** | **2,715** | | |
| Measure 2-L1: Solar in New Residential Development | 37 | 25% | of new houses to participate |
| Measure 2-L2: Solar in Existing Residential Building | 868 | 15% | of existing homes with solar |
| Measure 2-L3: Solar in New Non-Residential Developments | 13 | 5% | of new non-residential development to participate |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 1,798 | 25% | of existing non-residential development with solar |
| **Goal 3: Switch Equipment from Fossil Fuel to Electricity** | **162** | | |
| Measure 3-L1: Convert to Electric Water Heating | 162 | 10% | of households |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **311** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 282 | 50% | of growth to result in mixed use |
| Measure 4-L2: Increase Transit Accessibility | 23 | 15% | of growth to be 25+ units |
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| Measure 4-L4: Affordable Housing Linked to Transit | 6 | 15% | of new development to be affordable |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **83** | | |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 83 | 100% | of trips affected |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 5-L7: Supporting Parking Policy Measures | NQ | Yes | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **63** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 31 | 50 | charging stations installed |
| Measure 7-L2: Electrify Construction Equipment | 32 | 5% | of equipment |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | NQ | Yes | |
| **Goal 11: Reduce Water Consumption** | **1,368** | | |
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 788 | 15% | Reduction in per capita water use |
| Measure 11-L2: Water Conservation for New Construction* | 103 | 100%/50% | % of new residential/ nonresidential development |
| Measure 11-L3: Water Conservation for Existing Buildings* | 478 | 25%/10% | % of new residential/ nonresidential development |
| **State Measure Reductions in Windsor** | **40,020** | | |
| **Regional Measure Reductions in Windsor** | **15,540** | | |
| **Local Measure Reductions in Windsor** | **4,840** | | |
| **Grand Total Emissions Reductions in Windsor** | **60,390** | | |

*Measures reduce emissions from multiple sources (i.e. water and energy)

NQ = not quantified

### 5.9.5 Municipal Greenhouse Gas Reduction Measures

Like the other cities and the county, Windsor has recognized the need to reduce GHG emissions from municipal operations. The Town of Windsor completed an assessment of GHG emissions for municipal facilities in 2003, thereby establishing a baseline for year 2000. The Town Council demonstrated leadership on this issue by adopting a GHG Emission Reduction Action Plan in 2008, documenting a path to a 26.2% reduction in GHG emissions by 2020. Progress toward the Town goal is reviewed by the Town Council every 2 years. The most recent review, in April 2015, showed that the Town is on track to meet and perhaps even exceed its GHG reduction goal. (Gilleran Energy Management, Inc., 2015)

Over the last decade, the Town has implemented a number of energy reduction projects that will also result in GHG reductions. These include lighting upgrades, street lighting conversions to LED, a PV system atop the municipal gymnasium, cool roofs to reflect sunlight to avoid overheating buildings, water supply pump retrofits, and the purchase of energy-efficient vehicles including hybrids. The Town also purchases diesel fuel with 5% biodiesel, reducing emissions from diesel-fueled vehicles. The Town estimates that the combination of all these actions will result in a projected 35% reduction (below 2,000 levels) of GHG emissions from Town-owned and -operated equipment and facilities by 2020.

Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. Windsor and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# Unincorporated
# Sonoma County

## Commitments to meeting community greenhouse gas reduction goals.

# 5.10 Unincorporated Sonoma County

This section presents the community greenhouse gas (GHG) emissions profile specific to the unincorporated county and the measures that the County of Sonoma will implement, with the support of the RCPA and other regional entities, as part of the regional approach to reducing GHG emissions.

## 5.10.1 Community Summary

The unincorporated portion of Sonoma County includes all areas not within the jurisdictional limits of Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, or Windsor. Located in Northern California in the heart of Wine Country, Sonoma County has a unique position near the Pacific Ocean and the San Francisco Bay Area. Sonoma County is renowned for its scenic landscapes—from open hillsides, plentiful valleys, celebrated vineyards, and agricultural lands to the Russian River and the picturesque Sonoma Coast. The geographic features and climatic variation of Sonoma County contributes to its success in wine production and other agricultural activities. Sonoma County's land uses reflect the residential and rural values of the county while supporting strong local industries.

### Demographics

The unincorporated county covers approximately 1,684 square miles (the entire county is 1,768 square miles) and has largely residential, commercial, and agricultural land uses. The unincorporated county had a population of 121,281 as of the 2010 census. In 2020, the population is expected to be 124,100, an increase of 2% compared to 2010. Employment in the area is expected to increase by 14%.

The countywide demographic composition in 2010 was 87% White, 0.5% African American, 0.5% Native American, 3% Asian, 0.2% Pacific Islander, 7% from other races, and 2.5% from two or more races (demographic composition data for the unincorporated county is not available). Persons of Hispanic or Latino origin were 15%.

As shown in Table 5.10-1, the unincorporated portion of the county is expected to experience steady growth in population, housing, and jobs in the future.

### Table 5.10-1. Unincorporated County Socioeconomic Data

| | Actual | | Projected | | | |
|---|---|---|---|---|---|---|
| | 1990 | 2010 | 2015 | 2020 | 2040 | 2050 |
| Population | 146,796 | 121,281 | 123,025 | 124,100 | 134,121 | 140,390 |
| Housing | 54,633 | 49,049 | 49,933 | 50,894 | 55,234 | 57,755 |
| Employment | 45,413 | 41,486 | 44,367 | 47,257 | 49,852 | 51,579 |

Socioeconomic data were derived from the SCTA travel demand model and incorporate input from the County based on its internal planning forecasts.

According to the 2010 Census, housing in the unincorporated areas of the county is majority owner-occupied with 63% of all housing units owned and 37% rented.

## Energy and Water Use

Compared to households in the county as a whole, households in the unincorporated areas use less natural gas but more electricity and water. Households in the unincorporated county are, overall, located in more rural areas, which are generally less efficient than households located in more urbanized areas. Larger, more rural houses typically have a higher water footprint because of increased landscaping needs. Unincorporated county households use less electricity, natural gas, and water than households statewide, however.

### Table 5.10-2. Unincorporated County, Total County, and State 2010 Average Energy and Water Use (per household, per year)

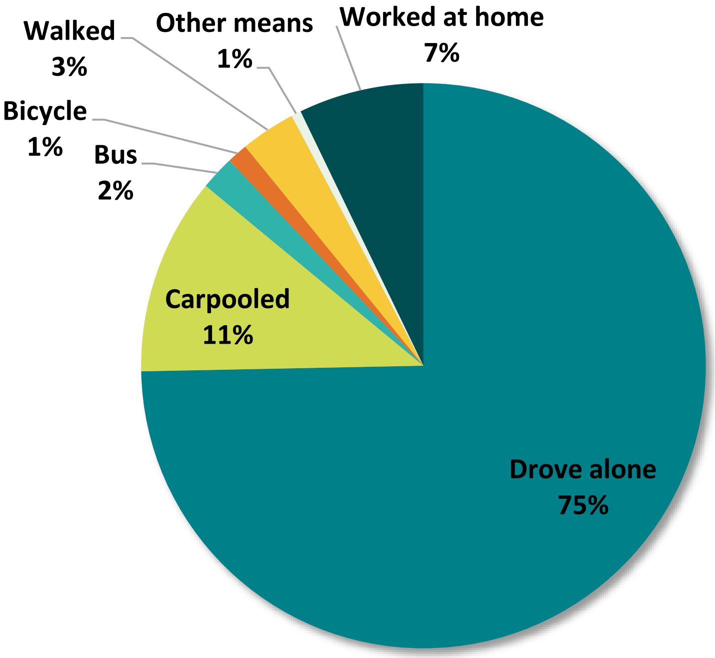
| | Unincorporated Sonoma County | All County | State |
|---|---|---|---|
| Electricity (kWh) | 9,207 | 7,042 | 9,320 |
| Natural Gas (Therms) | 375 | 413 | 512 |
| Water Use (Gallons) | 93,365 | 75,810 | 107,869 |

Sources:
City Data: provided by PG&E (energy) and by the SCWA Urban Water Management Plan.
County Data: provided by PG&E (energy) and the cities or their Urban Water Management Plans (water).
State Data: U.S. Energy Information Administration 2009, U.S. Geological Survey 2014, California Department of Finance 2015.
kWh = kilowatt hours

## Transportation Commute Modes

In the inventory year 2010, most unincorporated area residents (75%) drove alone to work and about 11% carpooled, which is similar to other Sonoma County communities. The average trip to work for the total county, including unincorporated and incorporated areas, is 25.3 minutes (U.S. Census Bureau 2014).

**Figure 5.10-1. Modes to Work in the Unincorporated County in 2010**



Source: U.S. Census Bureau 2014: American Community Survey 2006–2010

## 5.10.2 The County's Existing Actions to Reduce GHG Emissions

The County has already taken a number of steps to reduce energy use, promote renewable energy use, and other actions that have already been helping to reduce GHG emissions. The County has also implemented projects and adopted ordinances and General Plan policies that would also help to reduce GHG emissions and will support the implementation of the formal GHG reduction measures in this CAP. These are summarized below.

- Building Energy
    - CALGreen Building Standards Code: County Code Chapter 7. Tier 1 measures for residential and non-residential structures adopted as mandatory.
    - Comprehensive Energy Project on County Facilities. Conservation measures employed at County facilities: Upgraded lighting technology, thermal energy storage, variable speed controls, and HVAC improvements.
    - Residential Retrofits: CDC retrofitted 1073 homes through housing/mobile home rehabilitation programs.
    - Property Assessed Clean Energy (PACE) Program: Via AB 811 and SB 555 property owners may finance energy and water efficiency and conservation, and renewable generation improvements to existing homes and business properties via a special voluntary property tax assessment.

- Sonoma PACE Financing Marketplace: The offering of multiple PACE financing products to property owners in the county including products such as the County's SCEIP, California FIRST, California HERO, and Figtree Finance.
- PACE Program Permitting and Inspection Procedures: Special permit procedure for energy and water conservation improvements financed through PACE; permitting for building projects not typically requiring permits.
- County of Sonoma Energy Independence Office: Serves as a community clearinghouse of information, tools, services, programs, financing information, and resources for the general public, contractor communities, and other public entities engaged in pursuing energy and water efficiency and renewable energy initiatives. The office operates and administers County programs including the Sonoma PACE Financing Marketplace (including SCEIP), Energy Watch Program, Green Business Program, Windsor Pay-As-You-Save, and the residential rebate program for Healdsburg Electric.
- Sonoma County Energy Watch (SCEW): a local government partnership between the County of Sonoma's Energy and Sustainability Division and PG&E designed to reduce energy usage and expenses. The program provides energy efficiency services to local governments, special districts, nonprofit organizations, and small to medium businesses. These services include: no-cost energy audits, technical assistance, project consultation, enhanced rebates and incentives, and an on bill financing option. Between the program's inception in 2009 and the end of 2014, nearly $2 million in incentives have been paid to over 470 projects. The resulting energy savings are estimated to be 10,500,000 kWh/year.
- Sonoma County retrofit/renewables program: This program provides residential and commercial property owners with one-stop success to energy analysis, certified vendors, and a financing package for solar and energy efficiency retrofit projects, working in collaboration with SCEIP and leveraging that existing resource.
- Solar photovoltaic electrical generation at County facilities to augment county needs. 750 kW solar energy system plus 706 kW system at the Los Guilicos Juvenile Justice Center. The two PV systems are designed to generate enough clean energy to cover 100% of the campus electricity bills. This represents the average electricity use of 105 homes and is expected to reduce GHG by 324 metric tons over its 25-year life.
- The County's General Services Department has implemented 38 County facility energy efficiency projects on 24 different County-owned buildings. This work will ultimately save $41.6 million in energy use over the lifetime of the improvements.
- Landfill Gas Power Plant: produces over 7 megawatts (MW) of renewable electrical energy 24 hours/day, 7 days/week, enough to power a community of 17,000 people. The electricity is sold to the Power and Water Resources Pooling Authority, which provides carbon-free electricity to SCWA, among other entities. A BioGas Filtration Plant (also called the CNG plant) was completed in February 2009. CNG produced at the Central

    Disposal Site is currently used to fuel select vehicles in the Sonoma County Transit bus fleet. The plant uses membrane filtration to convert landfill gas to vehicle fuel.

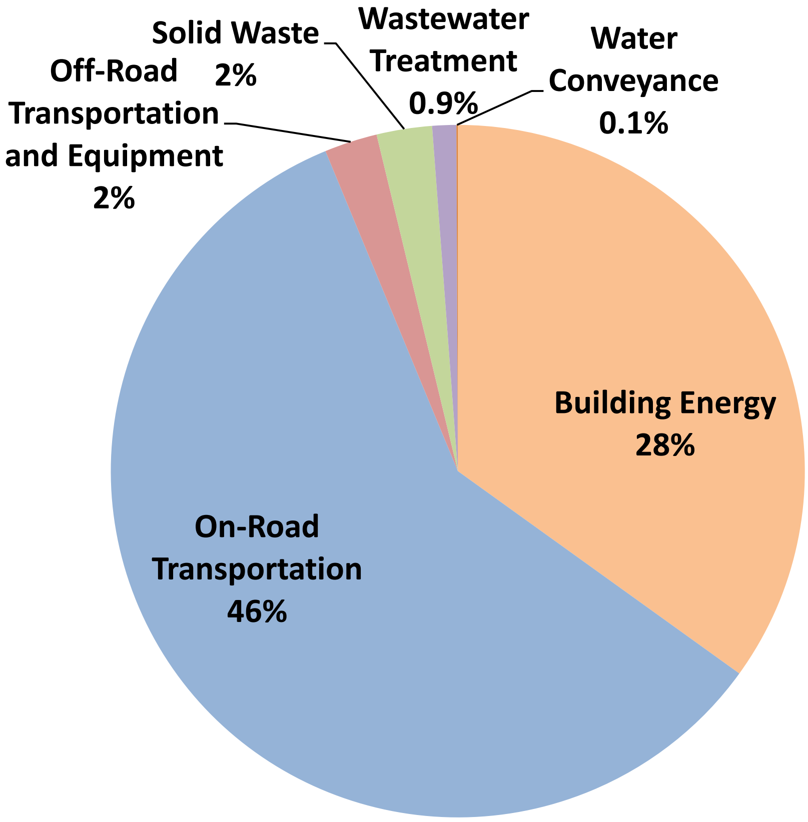
  - Sonoma Clean Power Community Choice Aggregation (CCA): Several cities and the County formed SCP to provide electricity with a higher percentage of non-fossil fuel energy sources. Transmission, distribution, customer service and billing remain the same, delivered through the existing utility (PG&E).
  - Hydropower: The Warm Springs Dam was completed in 1984, a hydroelectric turbine was installed a few years later and has been producing electricity since the late 1980s. This turbine has a generation capacity of 2.6 MW. Since energy production is influenced by the flow of water through the dam, actual energy production is usually at about 1.3 MW. Actual annual energy production from 2006 to 2008 was approximately 11,800 to 14,800 megawatt-hours.
  - In 2013 the Sonoma County Zoning Code was amended to enable the construction and use of renewable energy facilities including bioenergy, geothermal, solar, wind, cogeneration, and similar technologies. Uses are now classified into two categories of Accessory systems and Commercial Facilities allowing streamlining with special use standards.
- Land Use and Transportation
  - Fleet Operations Division: Sonoma County was named the #1 2015 Government Green Fleet in North America Award Winner and has been a Government Green Fleet Award Winner in 2010, 2011, 2012, 2013 and 2014. Other designations include a US Environmental Protection Agency (EPA) Clean Air Excellence Award Winner 2015, an Accredited NAFA Sustainable Fleet 2015, a Fleet Technology Top Tier Light & Medium Duty Efficient Fleet Award 2015, California EPA Governor's Environmental and Economic Leadership Award Winner 2013, a Green Fleet 40 Sustainability All Stars Award Winner 2013 and the Bay Area Climate Collaborative "Most EV-Ready Community" Award 2012 and 2011. Sonoma County Transit Fleet changes:
    - In 1990, Sonoma County’s transit and paratransit fleets were 100% diesel powered. In 1996, the transition to CNG buses began with the addition of 15–40-foot heavy-duty coaches.
    - In 2000, approximately 31% of the Sonoma County Transit fleet was powered by natural gas and diesel vehicles dropped to 57%. During this period, more gasoline powered minibuses were introduced into the fixed-route fleet, representing approximately 12% of the fleet makeup.
    - By 2010, all of the County’s 30- and 40-foot heavy duty coaches had transitioned to CNG, representing 92% of the fleet. The remainder of the fleet comprises small gasoline-powered minibuses. The 2013 fleet composition remains the same as 2010; however, the average vehicle age has decreased. With the delivery of nine new

    (replacement) 40-foot CNG buses in 2014, the fleet total will remain the same, but the average vehicle age will again decrease.

- Waste Minimization and Recycling
    - AB 939 compliance for solid waste generation and diversion, which requires California cities, counties, and approved regional solid waste management to divert 25% of their solid waste by 1995 and 50% by year 2000 and afterward.
    - Sonoma Green Business Program: Provides certification and resources for small to medium-sized consumer-oriented businesses that express a desire to contribute to sustainability efforts through resource conservation.
    - Recycling Market Development Zone Program (RMDZ): Businesses that use recycled material in their products, and are located within RMDZs, are eligible for loans, technical assistance, relaxed building permits, and other incentives. The program originated from CalRecycle, but is administered at the local level by zone administrators throughout the state.
- Water and Wastewater Efficiency
    - Reduced size and cost of standard septic systems when low flow plumbing fixtures are installed.
    - Sonoma County Water Efficient Landscape Ordinance: County Code Chapter 7D3. Regulates the design, installation, and maintenance of new and rehabilitated landscapes in terms of plant selection, soil amendments, water features such as recycled water, and irrigation systems.
- Agriculture, Urban Forestry and Natural Areas
    - Open Space Conservation: Over 250,000 protected acres in the County, including 106,000 acres protected by the Sonoma County Agricultural Preservation and Open Space District as well as lands protected through other programs, including agricultural land preservation through the County's ongoing participation in the Williamson Act.

### 5.10.3 Greenhouse Gas Inventory and Forecast

**Figure 5.10-2. Unincorporated Sonoma County 2010 Community GHG Inventory by Source**



The unincorporated area's inventory is similar to cities in the county and state in many respects. The majority of the GHG emissions are from on-road transportation due to fossil fuel combustion in personal and light-duty vehicles. The next largest source is building energy, which includes emissions related to energy used to heat the homes, and business in the county. Most energy consumption in the unincorporated areas of the county is for residential purposes, with 57% of building energy emissions resulting from residential uses. Commercial energy use emissions account for 39% of building energy emissions. Emissions resulting from energy consumed for industrial purposes are a small fraction (4%) of total energy use emissions in the community. The other categories of emissions are much smaller in comparison to building energy and on-road transportation.

In the unincorporated county, total GHG emissions generated by community activities in 2010 were 1,004,510 $MTCO_2e$, which is approximately 39% of countywide GHG emissions in the same year. This is a 19% decrease from estimated 1990 emissions, which were 1,244,320 $MTCO_2e$. The decrease in emissions from 1990 is partly due to a decrease in population, employment, and housing for the unincorporated county, as the cities annexed unincorporated land into their limits. Therefore, a portion of the reduction in emissions is due to changes in the jurisdictional boundaries of the cities, and not actually due to a decrease in emission-generating activities within the unincorporated areas.

### Table 5.10-3. Unincorporated Sonoma County Community GHG Backcast, Inventory, and Forecasts

| Source | 1990 Backcast | | 2010 Inventory | | 2015 Forecast | | 2020 Forecast | | 2040 Forecast | | 2050 Forecast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building Energy | 502,330 | 40% | 350,950 | 35% | 386,270 | 36% | 401,390 | 36% | 430,210 | 36% | 447,780 | 37% |
| On-Road Transportation | 519,670 | 42% | 590,970 | 59% | 612,650 | 58% | 657,210 | 58% | 688,330 | 57% | 680,920 | 56% |
| Off-Road Transportation and Equipment | 26,550 | 2% | 24,780 | 2% | 27,010 | 3% | 29,600 | 3% | 43,640 | 4% | 44,380 | 4% |
| Solid Waste | 170,730 | 14% | 25,900 | 3% | 27,140 | 3% | 28,320 | 3% | 30,140 | 2% | 31,320 | 3% |
| Wastewater Treatment | 13,610 | 1% | 11,240 | 1.1% | 11,400 | 1% | 11,500 | 1% | 12,430 | 1% | 13,010 | 1% |
| Water Conveyance | 11,440 | 1% | 660 | 0.1% | 780 | 0% | 790 | 0% | 850 | 0% | 890 | 0% |
| **Total** | **1,244,320** | **100%** | **1,004,510** | **100%** | **1,065,260** | **100%** | **1,128,810** | **100%** | **1,205,610** | **100%** | **1,218,310** | **100%** |
| **Per-Capita Emissions** | **8.5** | | **8.3** | | **8.7** | | **9.1** | | **9.0** | | **8.7** | |

## 5.10.4 Greenhouse Gas Reduction Goal and Measures

The County of Sonoma in representing the unincorporated portion of the county joins the other Sonoma County communities to support the countywide GHG emissions reduction target of 25% below 1990 countywide emissions by 2020 through adoption of 24 local GHG reduction measures. The county's GHG emissions under 2020 BAU conditions (in absence of state, regional, and local measures) would be approximately 1,128,810 $MTCO_2e$. The county's local GHG reduction measures, in combination with state and regional measures, would reduce the county's GHG emissions in 2020 to 781,160 $MTCO_2e$, which would be a reduction of approximately 31% compared to 2020 BAU conditions. The county will achieve these reductions through reduction measures that are technologically feasible and cost-effective per AB 32 through a combination of state (70%), regional (21%), and local (9%) efforts. Per-capita reductions in the county in 2020 would be 2.8 $MTCO_2e$ per person.

**Table 5.10-4. Unincorporated Sonoma County 2020 GHG BAU Emissions, Reductions, and CAP Emissions**

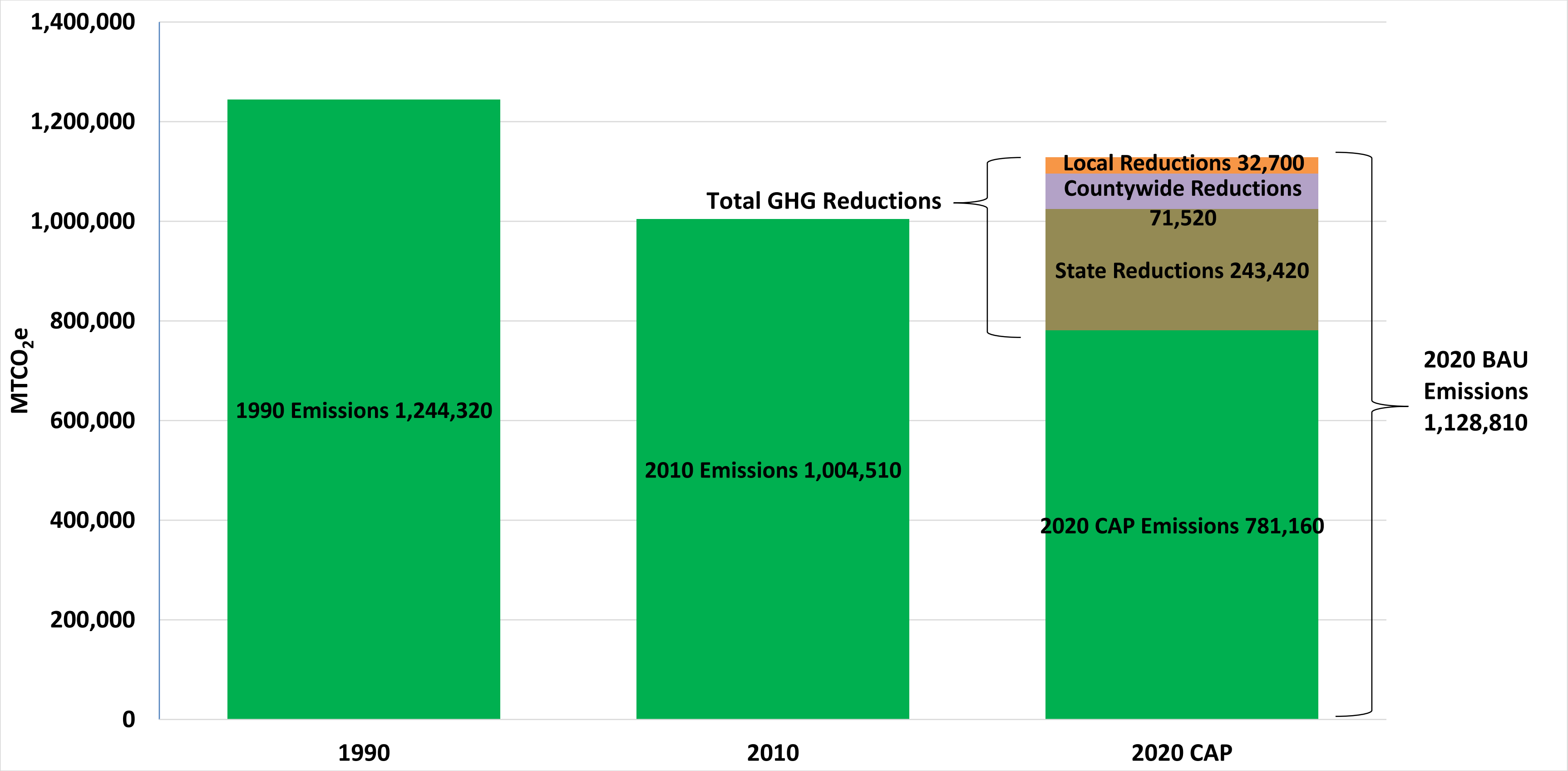
| Source | 2020 BAU Forecast | Reductions | | | | 2020 CAP Emissions | % Reduction From BAU |
|---|---|---|---|---|---|---|---|
| | | State | County-wide | Local | Total | | |
| Building Energy | 401,390 | 100,930 | 32,800 | 19,650 | 153,370 | 248,020 | 38% |
| On-Road Transportation | 657,210 | 139,870 | 17,450 | 8,250 | 165,570 | 491,640 | 25% |
| Off-Road Transportation and Equipment | 29,600 | 2,620 | - | 70 | 2,690 | 26,910 | 9% |
| Solid Waste | 28,320 | - | 20,630 | - | 20,630 | 7,690 | 73% |
| Water Conveyance | 790 | - | 500 | 4,730 | 5,230 | -[1] | 100% |
| Wastewater Treatment | 11,500 | - | 150 | - | 150 | 11,350 | 1% |
| **Total Emissions** | **1,128,810** | **243,420** | **71,520** | **32,700** | **347,650** | **781,160** | **31%** |
| | | **70%** | **21%** | **9%** | | | |

Values may not sum due to rounding.

[1] The CAP reduction for the water conveyance sector is greater than 2020 BAU emissions because it contains emission reductions from multiple sectors. Water conveyance measures reduce improve efficiency, which reduces electricity use within the building energy sector.

Figure 5.10-3 shows the county's 1990 and 2010 GHG emissions total, 2020 BAU emissions forecast total, and the total emissions remaining after implementation of the county's reduction measures. The contribution of state, countywide, and local reductions are overlaid on the 2020 BAU emissions forecast total, representing the total emissions reductions achieved in 2020. As noted above, the decrease in emissions from 1990 is partly due to changes in the jurisdictional boundaries of the cities, and not actually due to a decrease in emission-generating activities within the unincorporated county.

Figure 5.10-3. Unincorporated Sonoma County 1990, 2010, and 2020 GHG Emissions; 2020 State and Local Reductions



## Greenhouse Gas Reduction Measures

As shown in Table 5.10-5, the County of Sonoma will achieve its reduction goal through a combination of state, regional, and local measures. State reduction measures are implemented through state law, including some that require action by the County to comply with state mandates (e.g., Title 24 energy efficiency measures). State reductions total 243,420 $MTCO_2e$, which include the Pavley vehicle standards, Title 24 building standards, the state's low carbon fuel standard, and the RPS.

Regional measures will reduce emissions by 71,520 $MTCO_2e$ and will be implemented by countywide entities, including RCPA, SCWA, County of Sonoma Energy Independence Office, SCTA, and SCP.

An additional reduction of 32,700 $MTCO_2e$ will be achieved through local measures. The locally adopted measures, although not as high-achieving of GHG reductions as the state and regional measures, are important because they represent the actions that local communities can take directly. The communities have local control over their infrastructure and policies and have selected the local measures that best suit the needs of their community.

The three measures that will have the greatest impact in the unincorporated county are, in order of importance, Measure 2-L4 (Solar in Existing Non-Residential Buildings), Measure 2-L2 (Solar in Existing Residential Buildings), and Measure 11-L1 (Senate Bill SB X7-7 - Water Conservation Act of 2009). These three measures, in addition to reducing GHG emissions, will save energy, and conserve natural resources.

On the state level, the RPS and the Pavley measures have the greatest potential to reduce emissions in the unincorporated county. Of the regional measures, those with the greatest impact are the Community Choice Aggregation (CCA) measure, the waste-to-energy measure, and the waste diversion measure.

Table 5.10-5 presents the individual GHG reduction measures that Sonoma County has selected for the CAP. For more information on the specifics of each measure, see Appendix C.

**Sonoma County Green Business Program**

Sonoma County Green Business is an award winning program that has been verifying green businesses in the County for many years. The program ensures that businesses who want to be certified meet high standards of environmental performance. The standards that the program sets, in addition to reducing GHG emissions and helping the County meet its goal, ensure water and energy conservation, and reduce air pollutants that can cause health problems for certain populations.

**Table 5.10-5. Unincorporated Sonoma County 2020 GHG Emissions Reductions by Measure**

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate |
|---|---|---|
| **State and Regional Measures** | | |
| **Goal 1: Increase Building Energy Efficiency** | **23,979** | |
| Measure 1-S1: Title 24 Standards for Commercial and Residential Buildings | 4,821 | N/A |
| Measure 1-S2: Lighting Efficiency and Toxics Reduction Act (AB1109) | 9,945 | N/A |
| Measure 1-S3: Industrial Boiler Efficiency | 345 | N/A |
| Measure 1-R1: Community Energy Efficiency Retrofits for Existing Buildings | 3,126 | N/A |
| Measure 1-R2: Expand the Community Energy Efficiency Retrofits Program | 5,744 | N/A |
| **Goal 2: Increase Renewable Energy Use** | **108,726** | |
| Measure 2-S1: Renewables Portfolio Standard | 85,487 | N/A |
| Measure 2-S2: Solar Water Heaters | 330 | N/A |
| Measure 2-R1: Community Choice Aggregation | 22,909 | N/A |
| **Goal 3: Switch Equipment from Fossil Fuel to Electricity** | **1,022** | |
| Measure 3-R1: Stationary Fuel Switching Incentives | 1,022 | N/A |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **13,040** | |
| Measure 5-R1: Improve and Increase Transit Service | < 1 | N/A |
| Measure 5-R2: Supporting Transit Measures | NQ | N/A |
| Measure 5-R3: Sonoma-Marin Area Rail Transit | NQ | N/A |
| Measure 5-R4: Trip Reduction Ordinance | 2,516 | N/A |
| Measure 5-R5: Supporting Measures for the Transportation Demand Management Program | NQ | N/A |
| Measure 5-R6: Reduced Transit Passes | 2,330 | N/A |
| Measure 5-R7: Alternative Travel Marketing & Optimize Online Service | 1,864 | N/A |
| Measure 5-R8: Safe Routes to School | 6,336 | N/A |
| Measure 5-R9: Car-sharing Program | NQ | N/A |
| Measure 5-R10: Bike Sharing Program | NQ | N/A |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 6: Increase Vehicle and Equipment Fuel Efficiency** | **139,873** | | |
| Measure 6-S1: Pavley Emissions Standards for Passenger Vehicles and the Low Carbon Fuel Standard | 129,432 | N/A | |
| Measure 6-S2: Advanced Clean Cars | 3,545 | N/A | |
| Measure 6-S3: Assembly Bill 32 Vehicle Efficiency Measures | 6,896 | N/A | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **7,029** | | |
| Measure 7-S1: Low Carbon Fuel Standard: Off-Road | 2,621 | N/A | |
| Measure 7-R1: Shift Sonoma County (Electric Vehicles) | 4,408 | N/A | |
| **Goal 9: Increase Solid Waste Diversion** | **8,303** | | |
| Measure 9-R1: Waste Diversion Goal | 8,303 | N/A | |
| **Goal 10: Increase Capture and Use of Methane from Landfills** | **12,323** | | |
| Measure 10-R1: Increase Landfill Methane Capture and Use for Energy | 12,323 | N/A | |
| **Goal 11: Reduce Water Consumption** | | | |
| Measure 11-R1: Countywide Water Conservation Support and Incentives | NQ | N/A | |
| **Goal 13: Increase Water and Wastewater Infrastructure Efficiency** | **257** | | |
| Measure 13-R1: Infrastructure and Water Supply Improvement | 104 | N/A | |
| Measure 13-R2: Wastewater Treatment Equipment Efficiency* | 153 | N/A | |
| **Goal 14: Increase Use of Renewable Energy in Water and Wastewater Systems** | **391** | | |
| Measure 14-R1: Sonoma County Water Agency Carbon Free Water by 2015 | 391 | N/A | |
| **Local Measures** | | | |
| **Goal 1: Increase Building Energy Efficiency** | **404** | | |
| Measure 1-L2: Outdoor Lighting | 392 | 20% | of outdoor lighting to participate |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| Measure 1-L3: Shade Tree Planting | 11 | 1,000 | trees planted |
| Measure 1-L4: Co-Generation Facilities | 1 | 10 | MWh of cogeneration |
| **Goal 2: Increase Renewable Energy Use** | **19,242** | | |
| Measure 2-L2: Solar in Existing Residential Building | 5,402 | 15% | of existing homes with solar |
| Measure 2-L4: Solar in Existing Non-Residential Buildings | 13,839 | 25% | of existing non-residential development with solar |
| **Goal 4: Reduce Travel Demand Through Focused Growth** | **681** | | |
| Measure 4-L1: Mixed-Use Development in City Centers and Along Transit Corridors | 681 | 20% | of growth to result in mixed use |
| Measure 4-L3: Supporting Land Use Measures | NQ | Yes | |
| **Goal 5: Encourage a Shift Toward Low-Carbon Transportation Options** | **7,569** | | |
| Measure 5-L1: Local Transportation Demand Management Program | 1,864 | 38% | of employees eligible |
| Measure 5-L2: Carpool-Incentives & Ride-Sharing Program | 3,634 | 78% | of employees eligible |
| Measure 5-L3: Guaranteed Ride Home | NQ | Yes | |
| Measure 5-L4: Supporting Bicycle/Pedestrian Measures | NQ | Yes | |
| Measure 5-L5: Traffic Calming | 518 | 100% | of trips affected |
| Measure 5-L6: Parking Policies | 1,553 | 10% | of area affected |
| Measure 5-L7: Supporting Parking Policy Measures | NQ | Yes | |
| **Goal 7: Encourage a Shift Toward Low-Carbon Fuels in Vehicles and Equipment** | **3** | | |
| Measure 7-L1: Electric Vehicle Charging Station Program | 3 | 5 | charging stations installed |
| Measure 7-L3: Reduce Fossil Fuel Use in Equipment through Efficiency or Fuel Switching | NQ | Yes | |
| **Goal 8: Reduce Idling** | **69** | | |
| Measure 8-L1: Idling Ordinance | NQ | 2 | minutes below state law |
| Measure 8-L2: Idling Ordinance for Construction Equipment | 69 | 2 | minutes below state law |

| State, Regional, and Local Measures | 2020 GHG Reductions | Participation Rate | |
|---|---|---|---|
| **Goal 9: Increase Solid Waste Diversion** | **3** | | |
| Measure 9-L1: Create Construction and Demolition Reuse and Recycling Ordinance | 3 | 3% | beyond baseline |
| **Goal 11: Reduce Water Consumption** | **4,712** | | |
| Measure 11-L1: Senate Bill SB X7-7 - Water Conservation Act of 2009* | 4,712 | 12% | Reduction in per capita water use |
| **Goal 12: Increase Recycled Water and Greywater Use** | **22** | | |
| Measure 12-L1: Greywater Use | 22 | 10% | greywater goal |
| **Goal 15: Reduce Emissions from Livestock Operations** | **NQ** | | |
| Measure 15-L1: Encourage voluntary manure management techniques that reduce emissions from the decomposition of manure at dairies | NQ | Yes | |
| Measure 15-L2: Encourage dairies and livestock operations to explore ways to reduce GHG emissions from enteric fermentation | NQ | Yes | |
| **Goal 16: Reduce Emissions from Fertilizer Use** | **1,759**** | | |
| Measure 16-L1: Encourage voluntary agricultural practices that reduce or eliminate the need for fertilizer (especially synthetic fertilizer) | 1,759 | Yes | |
| **State Measure Reductions in Unincorporated Sonoma County** | **243,420** | | |
| **Regional Measure Reductions in Unincorporated Sonoma County** | **71,520** | | |
| **Local Measure Reductions in Unincorporated Sonoma County** | **32,700** | | |
| **Grand Total Emissions Reductions in Unincorporated Sonoma County** | **347,650** | | |

* Measures reduce emissions from multiple sources (i.e. water and energy)

**Reductions from this measure are included in the countywide accounting of GHG reductions and are not jurisdiction-specific reduction totals.

NQ = not quantified

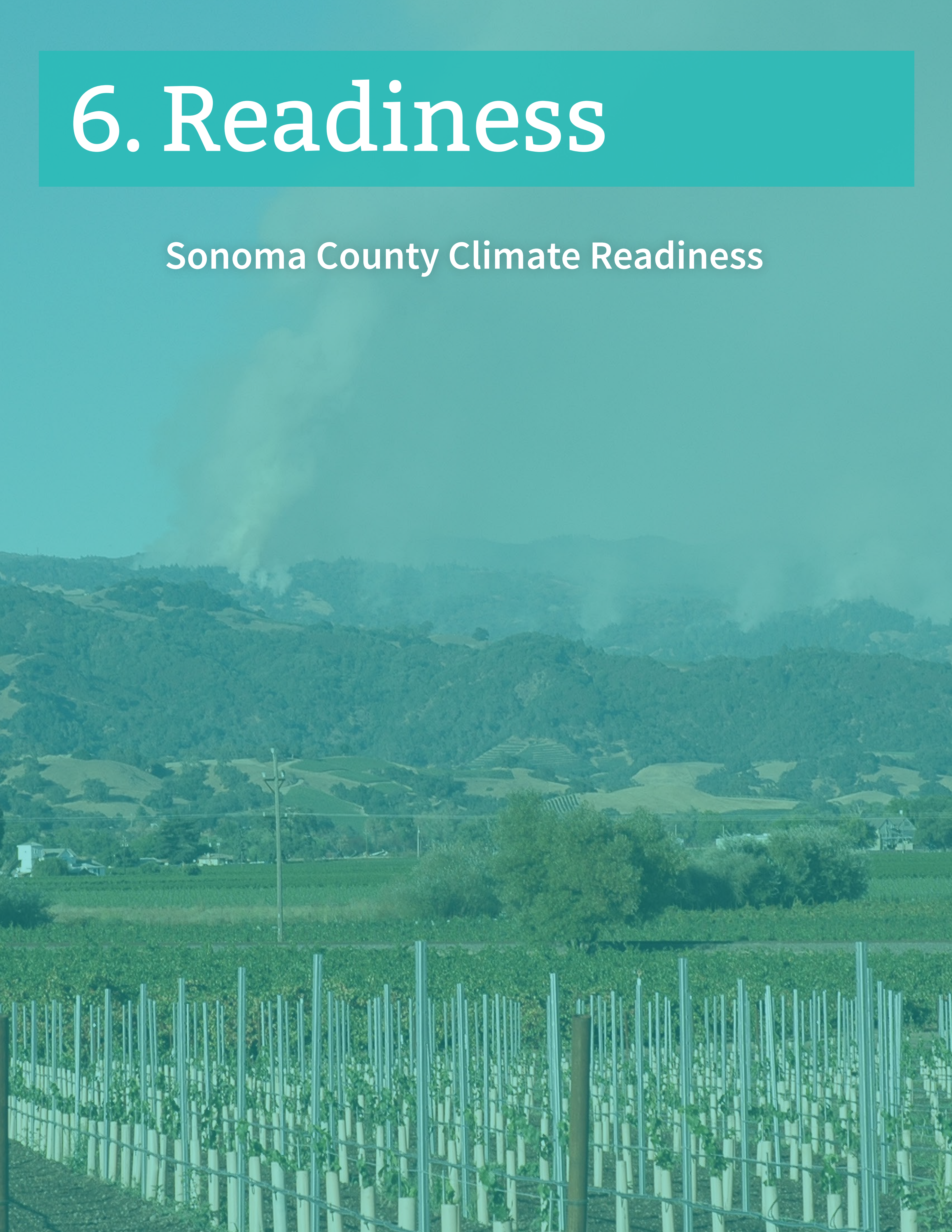
### 5.10.5 Municipal Greenhouse Gas Reduction Measures

Like the cities in Sonoma County, County government has recognized the need to reduce GHG emissions from municipal operations. In 2006, the County adopted its “Climate Protection Action Plan.” The Plan includes measures to reduce energy and water consumption in County government buildings and reductions in fleet vehicle fuel consumption and use of lower-carbon fuels, including electric vehicles, and set a target of reducing emissions from County operations by 20% by 2010. Implementation of this plan has been ongoing since adoption and the reduction target has been met and exceeded.

Although municipal GHG reduction measures are not part of this countywide plan, action by the cities and the County to reduce municipal emissions is still important. The County and the other local communities will continue to pursue actions that reduce GHG emissions from municipal operations. Descriptions of potential municipal GHG reduction measures are provided in Appendix E as an informational resource.

# 6. Readiness

Sonoma County Climate Readiness



# Chapter 6
# Sonoma County Climate Readiness

## 6.1 Introduction and Background

Sonoma County has long been a leader in addressing greenhouse gas (GHG) emissions and working to reduce the pace of climate change. Much of this work has focused on *climate mitigation*, which refers to reducing the amount of climate change, primarily through measures like those described in Chapter 3, *Reducing Community Emissions*.

However, even with the aggressive climate mitigation measures in Climate Action 2020 (CA2020), climate changes cannot be avoided entirely. Preparing for a changed climate is therefore a fundamental part of Sonoma County's overall climate action program. Reducing vulnerability to climate change hazards and bolstering community readiness to face the unavoidable climate impacts already underway are collectively referred to as *climate adaptation*. While climate mitigation and adaptation have different objectives, many strategies can be used to simultaneously achieve both goals (see Section 6.4.2).

This chapter provides a vulnerability assessment that evaluates potential impacts from anticipated climate change hazards on three key community resource areas. The assessment is not a comprehensive vulnerability analysis, nor does it provide site-specific prescriptions for action. Instead, the analysis provides a starting point for a countywide discussion on climate impacts and vulnerabilities and sets forth goals that the Regional Climate Protection Authority (RCPA) and local communities can use to guide future climate adaptation actions. This chapter also discusses strategies already underway to prepare for climate change, as well as recommendations for further improvement.

Information summarized in this chapter is drawn from the *Climate Ready Sonoma County: Climate Hazards and Vulnerabilities* report prepared by North Bay Climate Adaptation Initiative (NBCAI) for RCPA (Cornwall et al. 2014). NBCAI is a non-governmental organization comprising natural resource managers, policy makers, and scientists committed to working together to create positive solutions to the problem of climate adaptation for the ecosystems and watersheds of Sonoma County.

## 6.2 Climate Change Projections

Climate change projections analyze the likelihood that certain climate conditions will occur in the future. Various climate change models include different assumptions regarding the amount, location, and timing of change, and are thus subject to uncertainty regarding their results. The two primary sources of uncertainty in climate projections are *natural variation* and *climate mechanics*. Natural variation includes numerous independent processes that drive natural patterns on time scales ranging from minutes to seasons to decades, whereas climate mechanics refers to the complex physical processes that influence climate and how it responds to changing conditions. There is also uncertainty about how quickly and vigorously humanity will reduce GHG emissions. Given this uncertainty, climate change modeling projections are often considered "scenarios" based on long-term trends and estimates of variability (uncertainty is discussed in greater detail in the *Hazards and Vulnerabilities* report).

Despite the uncertainty and complexity inherent in climate change models, there are recurring themes that scientists agree are important to understanding what the future may hold for the region. Sonoma County already benefits from a number of cutting-edge efforts to understand climate trends, in part because local entities are key participants in these efforts. In particular, NBCAI used a set of projections for local temperature, precipitation, and hydrology across Sonoma County derived from the Basin Characterization Model (BCM) prepared by scientists from the U.S. Geological Survey and the University of California, Davis Center for the Environment (Flint et al. 2013). These projections were developed by applying global circulation models at a scaled-down resolution that helps identify watershed-level impacts of climate change here in Sonoma County.

Four of the BCM climate scenarios were selected to inform the vulnerability assessment. The two major variables among the four scenarios are GHG emission levels and precipitation. For example, if humans succeed in significantly reducing global GHG emissions in the near term ("mitigated GHG emissions") and precipitation levels increase ("more precipitation"), the future will be "warm/wet." Figure 6-1 identifies the scenarios based on the relationship among the two variables. The scenarios are described in greater detail in the *Hazards and Vulnerabilities* report.

**Figure 6-1. Future Climate Scenarios for Sonoma County**

| | Less Precipitation | More Precipitation |
|---|---|---|
| **High GHG Emissions**<br>(greater temperature increase) | **Hot/Dry"** | **Hot/Wet** |
| **Mitigated GHG Emissions**<br>(less temperature increase) | **Warm/Dry** | **Warm/Wet"** |

The difference between the "hot" and "warm" scenarios is based on the effects of higher GHG emissions versus lower (more mitigated) GHG emissions. There is uncertainty around precipitation in the global circulation models. Therefore, the difference between the "wet" and "dry" futures reflects the fact that different global climate models produce different rainfall projections.

## 6.3 Vulnerability Assessment

Climate vulnerability consists of the combined effect of exposure, sensitivity, and adaptive capacity, as defined below.

Different areas in Sonoma County will have different exposures to various climate change effects. For example, due to the county's coastal location, it will not be exposed to flooding from increased and rapid snowmelt. However, portions of Sonoma County will likely be subjected to an increased future risk of sea-level rise. Therefore, *exposure* is how much change a species or system is likely to experience. Section 6.3.1 identifies the climate change exposures that are projected to occur in Sonoma County.

Baseline conditions in communities and natural systems will influence sensitivity to a particular climate exposure. For example, an increase in extreme heat events is likely to disproportionately harm people, plants, and animals not acclimatized to extreme heat. In all locations, extreme heat will do more harm to those with compromised or fragile health. *Sensitivity*, then, is a measure of whether and how much a species or system is likely to be affected by its exposure. Section 6.3.2 evaluates the sensitivity of various community resources to the climate change exposures identified in Section 6.3.1.

An adaptation capacity assessment—an evaluation of the ability to avoid, accommodate, or cope with climate change impacts—is not included in this chapter. However, strategies already underway to prepare for climate change and goals for further improvement are described in Sections 6.4 and 6.5.

### 6.3.1 Climate Change Hazards in Sonoma County

The BCM scenarios and other recent studies indicate that climate change could affect Sonoma County in the following ways.

**Hotter, Drier Weather with Longer Summers**

- More extremely hot days
- More frequent and intense droughts
- More frequent and intense wildfires
- Fewer winter nights that freeze

**More Variable Rain**

- Greater risk of extreme floods

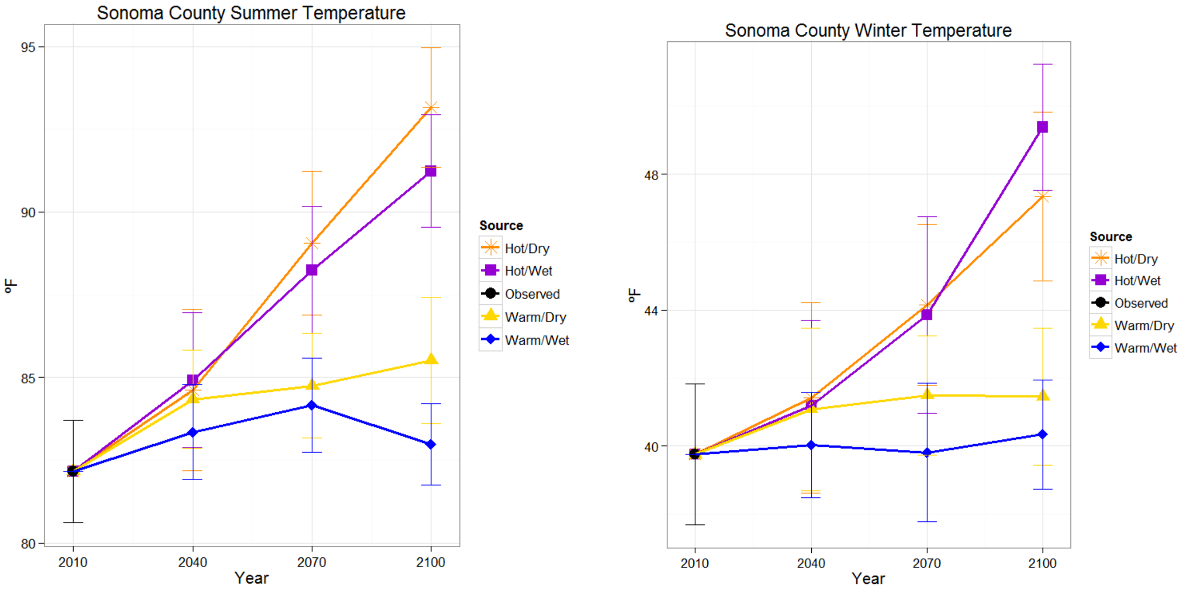
**Sea Level Rise**

- Higher sea level and storm surge

## Hotter, Drier Weather with Longer Summers

**Higher Average Temperatures and More Extreme Heat Events**: Sonoma County is expected to experience more very hot days and overall higher temperatures over a longer warm season. Average monthly maximum temperatures have already risen by 2.7 degrees Fahrenheit (°F) since 1900. Most climate change models project that temperatures will continue to rise, whether they use high or mitigated carbon emissions trends. Figure 6-2 depicts average summer high temperatures projected by the four models chosen for comparison in this report. In the two scenarios with mitigated emissions, summer high temperatures are expected to rise by 1 to 2°F. In the scenarios with uncurbed emissions, average summer high temperatures projected to increase by up to 9 to 11°F by 2100.

**Figure 6-2. Observed (1981–2010) and Projected Future Summer and Winter Temperature for Sonoma County**



Data source: California Basin Characterization Model, Flint et al. (2013).

Table 6-1 shows how these temperature increases can create public health and safety risks, by comparing the increases to the temperature threshold (95° ) for an “extreme heat event” as defined for the Santa Rosa area.

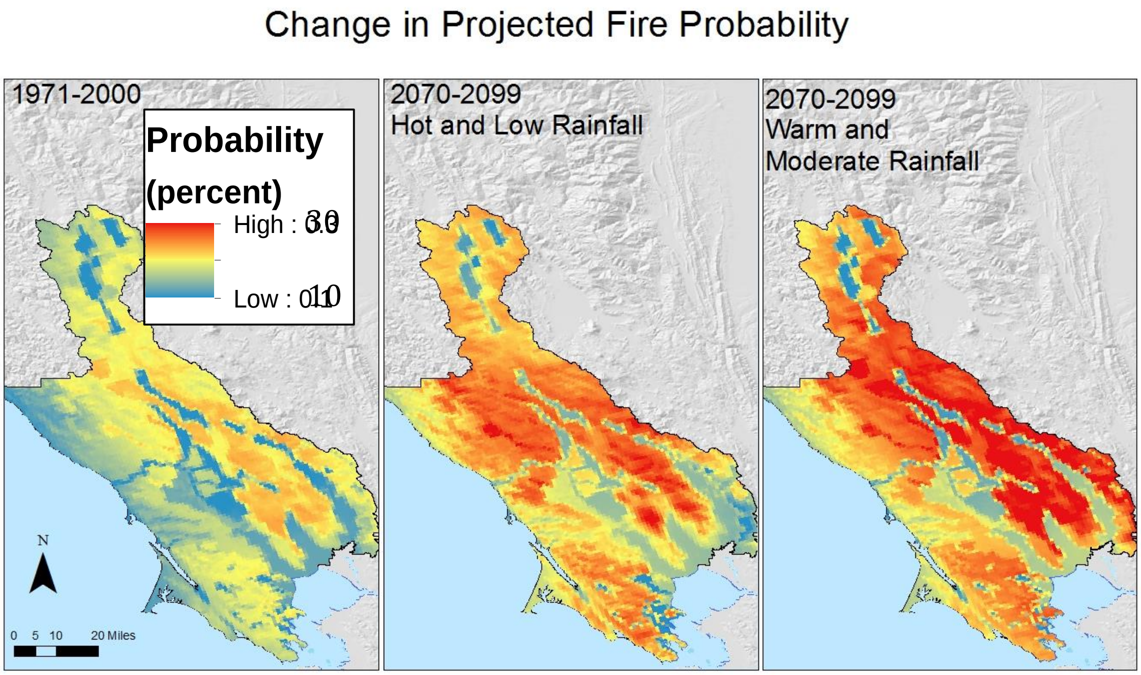
**Table 6-1. Number of Times per Year When Maximum Temperature Is Projected to Exceed 95°F for 3 or More Consecutive Days in the Santa Rosa Plain**

| Period | Number |
|---|---|
| 1981–2000 | 26 |
| 2010–2039 | 39 |
| 2040–2069 | 55 |
| 2070–2099 | 148 |

**More Frequent and Intense Droughts**: Whether the North Bay region experiences more or less rainfall overall, the land will likely be drier overall because warmer temperatures increase evapotranspiration (the loss of water from plants and soil into the air) even under the two "wet" scenarios. Climatic water deficit (CWD) is a numeric measure of drought stress that quantifies the extent to which plants' need for water exceeds moisture available in the soil. Three of the four climate scenarios examined in this report indicate a rising CWD for the 21st century while the "Warm/Wet" scenario indicates nearly equivalent CWD to the historic period. The CWD is projected to increase over this century, producing 10 to 20% drier soil conditions in the summer months, leaving less water available for groundwater recharge or runoff into rivers and creeks, increasing irrigation needs, and causing stress to natural vegetation and water-dependent ecosystems. The greatest increases in soil dryness are projected in the south and southeastern portions of the county.

**More Frequent and Intense Wildfire:** Risk of fire is likely to continue to rise due to increased dryness of vegetation, compounded by productivity of plants in the spring (which creates more fuel for dry season wildfires). By the end of this century, the chances of one or more fires during a 30-year period are projected to increase from 15–20% at present to 25–33% in the mountainous areas of the county, a fire regime akin to that experienced today in the Santa Monica Mountains of Southern California. See Figure 6-3.

**Figure 6-3. Changes in Projected Fire Probability for Sonoma County**

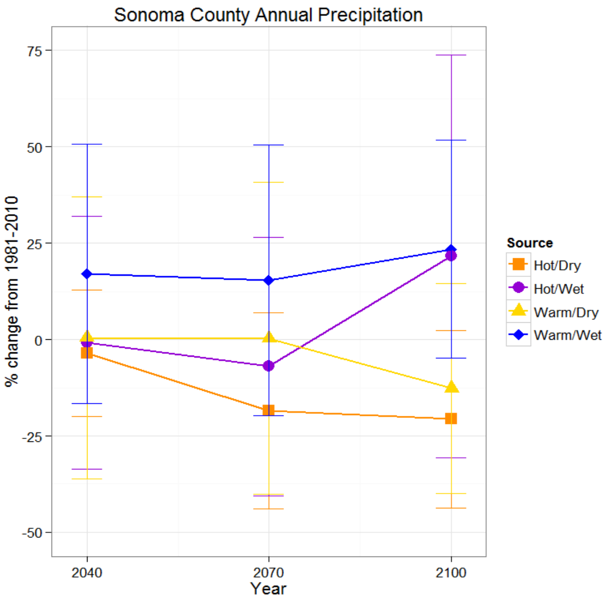


**Fewer Winter Nights that Freeze**: Projected winter low temperatures are also expected to rise in the future. In general, the coast, ridges, and mountain peaks will experience the most significant warming, whereas valley bottoms are projected to warm less dramatically. Figure 6-2 depicts projected winter low temperatures under the four scenarios included in this chapter. In the two models with mitigated emissions, winter low temperatures are expected to rise by 1 to 2°F. In the two models with uncurbed emissions, average winter low temperatures are projected to increase by up to 7 to 9°F by 2100. These increases have potential implications for controlling disease vectors, agricultural pests, and agricultural practices.

## More Variable Rain

While there is a direct link between higher GHG emissions and higher temperatures, there is disagreement about whether the future will be wetter or drier overall. Some models predict less annual rainfall in our region, while others predict more. However, all four climate scenarios evaluated in this chapter include more variation in the timing and amount of precipitation from individual rain events. All of the BCM scenarios indicate that Sonoma County will continue to have some years with precipitation similar to historic averages interspersed with more extreme conditions. The “Warm/Wet” scenario projects some years with an almost 75% increase in mean annual precipitation, while the “Hot/Dry” and “Warm/Dry” scenarios project years with decreases between 25–50% of historical averages (see Figure 6-4). Overall, the wettest scenario projects almost a 25% increase in precipitation compared to historical (20th century) conditions, whereas the driest scenario projects an approximately 20% decrease.

**Figure 6-4. Graph of Annual Precipitation Projected under Four Representative Climate Futures**



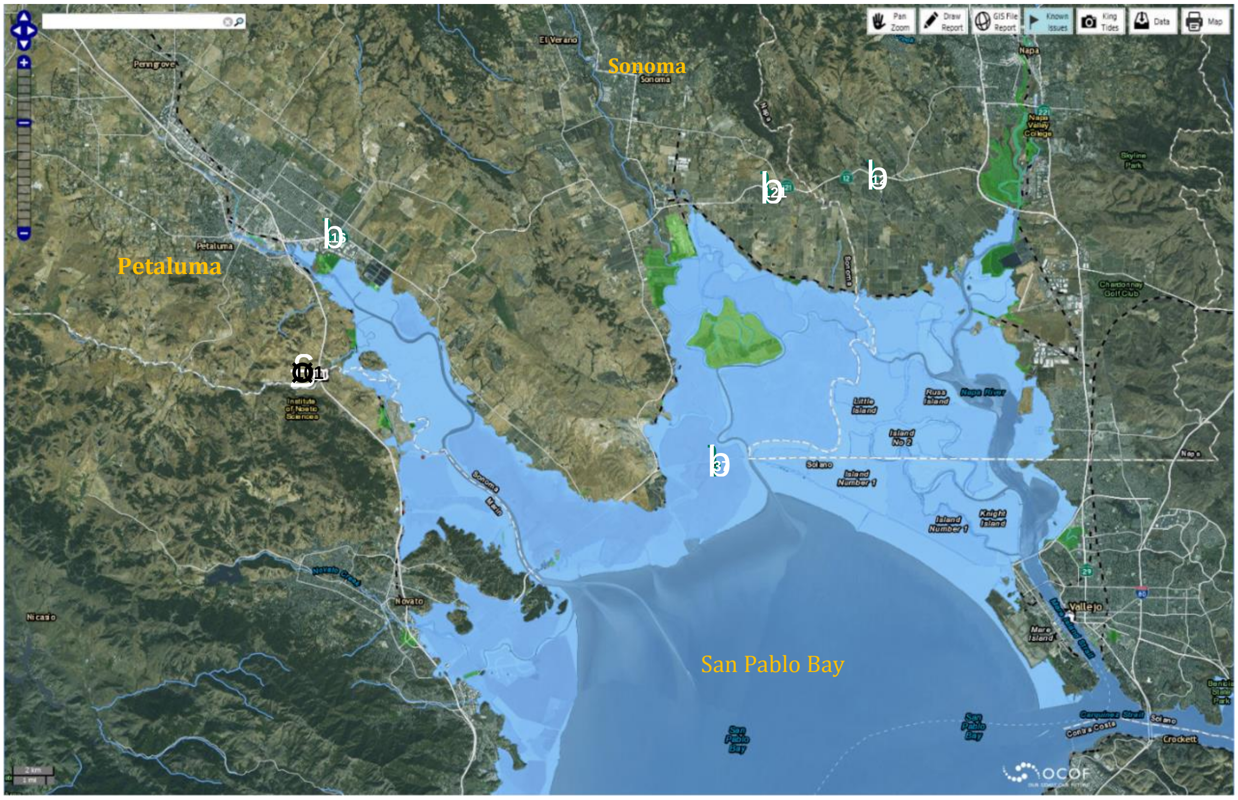
Whether the North Bay region experiences more or less total rainfall, the land will likely be drier overall because warmer temperatures increase evapotranspiration. Because most models project a shorter, more condensed wet season, this shift in rainfall timing combined with warmer weather causes soils and plants to dry out more by the end of the summer season compared to current conditions. Even models that project more winter rain also project reduced available soil moisture.

**Increased Risk of Extreme Floods**: The climate scenarios project increased seasonal variability of precipitation, runoff, and stream flows for Sonoma County, along with increased likelihood of "extreme" precipitation and drought events that were rare or unprecedented in the historic past. The precise risk of flood events is difficult to predict, however. Much of Sonoma County's wintertime precipitation comes in the form of "atmospheric rivers" from the Pacific Ocean. An atmospheric river is a relatively narrow ribbon of moisture in the atmosphere with ample moisture and strong winds. These atmospheric phenomena can produce very high precipitation in relatively focused areas. The amount and intensity of precipitation therefore depends greatly on where these atmospheric rivers make landfall. Under climate change projections for California, the average intensity of a typical atmospheric river does not increase, but there may be more years with more frequent storm events and occasional events that are much stronger than historical ones. Moreover, the length of the season over which storm events may occur is predicted to increase. These changes to the patterns of storm events may result in more frequent and more severe floods in Sonoma County.

## Sea Level Rise

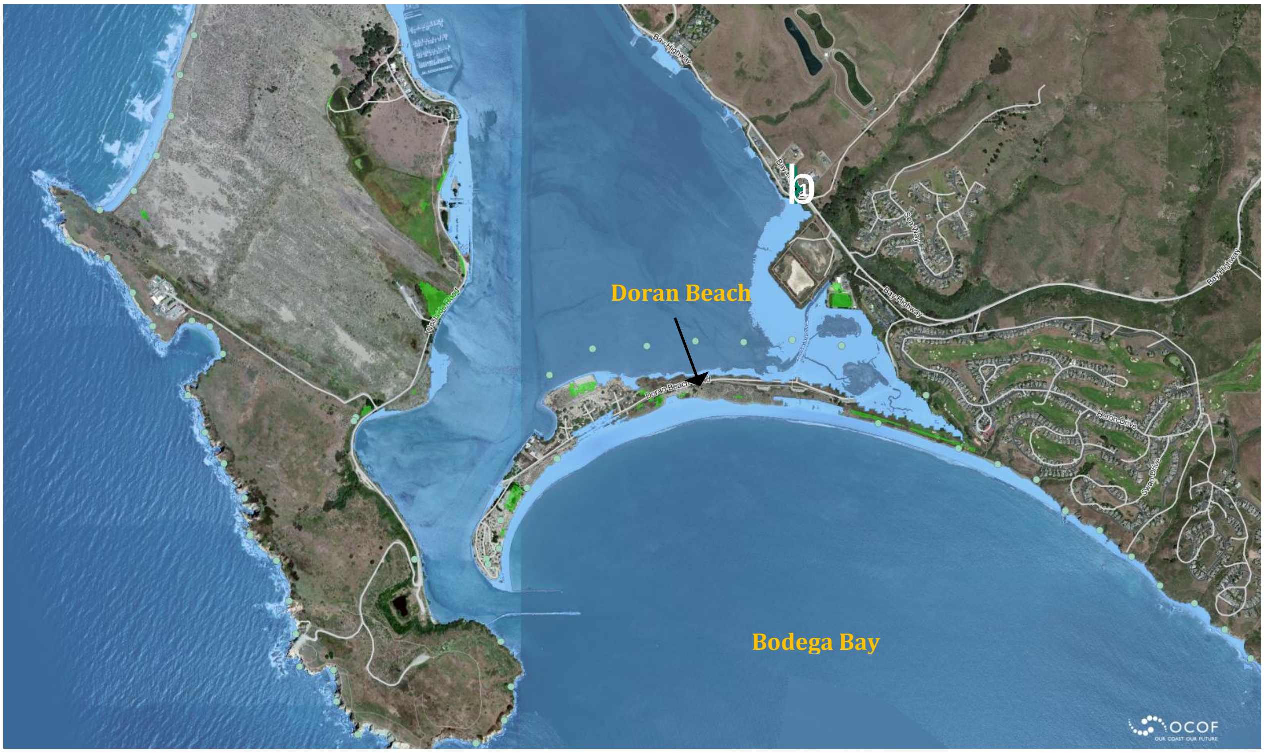
**More Frequent Coastal Flooding, Increased Erosion, and Saltwater Intrusion**: Sea levels are projected to rise between 16.5 and 65.8 inches by the end of this century. Rising sea levels, combined with increased storm surge, will lead to more frequent inundation of low-lying areas, and flooding of homes, infrastructure, agricultural lands, and natural areas on the shores of San Pablo Bay and the ocean coast, with the greatest impact anticipated during winter storms.

**Figure 6-5. Areas at Risk of Flooding with 39 Inches of Sea-Level Rise in Southern Sonoma County**


Pan Zoom
Draw Report
GIS File Report
Known Issues
King Tides
Data
Map
Sonoma
El Verano
Penngrove
Petaluma
Napa
Napa Valley College
Skyline Park
Chardonnay Golf Club
Institute of Noetic Sciences
Little Island
Russ Island
Island No 2
Island Number 1
Knight Island
Mare Island
Vallejo
Novato
Nicasio
San Pablo Bay
Crockett
OCOF

The areas at risk of flooding in southern Sonoma County with 39 inches of sea-level rise and a 20-year storm near the cities of Petaluma and Sonoma are shown in light blue. Darker blue is the current extent of the bay. Bright green areas are low enough to flood, but are protected by features such as levees or berms. Source: Our Coast Our Future (2014).

**Figure 6-6. Areas at Risk of Flooding with 39 Inches of Sea Level Rise near Bodega Bay**



Areas at risk of flooding near Bodega Bay with 39 inches of sea-level rise and a 20-year storm are shown in light blue. Darker blue is the current extent of the ocean. Bright green areas are low enough to flood, but are cut off from inundation by features such as levees or road berms. The light green dots show the extent of waves during a 20-year storm; note that waves are projected to pass over Doran Beach and into Bodega Harbor. Source: Our Coast Our Future (2014).

## 6.3.2 Climate Vulnerabilities in Sonoma County

The discussion in Section 6.3.1 shows that Sonoma County will be exposed to a variety of unavoidable climate change effects. However, as noted above, exposure does not necessarily mean that the community will be sensitive to the effect; individuals, property, and the environment may be exposed to a climate change threat but not sensitive to its consequence. For example, most healthy adults will adjust to small increases in average annual temperatures.

This section explores key vulnerabilities for three categories of community resources—people and social systems, built systems, and natural and working lands. A high-level overview of the resource, including essential functions and importance to the community, is presented first. Because climate sensitivity depends, in part, on baseline conditions, existing climate stressors are also briefly described for each resource. Anticipated vulnerabilities to the hazards identified in Section 6.3.1 are subsequently analyzed. Please refer to the *Hazards and Vulnerabilities Report* for summaries of climate exposures and vulnerabilities for each resource.

### People and Social Systems

People and social systems include Sonoma County's residents and visitors, households, neighborhoods, cities, economic activities, social services, food systems, education, business, emergency services, public safety, and law enforcement. These communities and community systems will exhibit a wide range of abilities to prepare for, respond to, and recover from climate hazards. In particular, disparities in health, education, and income levels will make certain populations and communities more vulnerable to climate change. The social systems that help support basic needs for people—including food, water, shelter, transportation, and healthcare—are also vulnerable to breakdown from climate-related crises, especially those systems that currently suffer from dwindling resources and financial support.

**Table 6-2. Climate Change Effects on People and Social Systems**

| **Hotter, Drier Weather with Longer Summers** | |
|---|---|
| More extremely hot days | • Increased heat-related illness, particularly among those inland, in poor health, working outdoors, in urban heat islands, and/or without air conditioning<br>• Premature death<br>• Added stress on emergency services and health care systems |
| More frequent and intense droughts | • Higher prices for water and food<br>• Water shortages from reduced surface and groundwater supplies<br>• Food shortages<br>• Potential pressure on housing and social services due to climate migrants<br>• Increase in respiratory problems<br>• Economic loss from decline in water-dependent recreation and tourism activities |
| More frequent and intense wildfires | • Risk of lost connections to energy, water, and food supplies, especially for isolated populations<br>• Displacement and loss of homes<br>• Injuries and death from burns and smoke inhalation<br>• Lung damage and exacerbation of eye and respiratory illness<br>• Economic loss from decline of recreation and tourism following a major fire |
| Fewer winter nights that freeze | • Potential increase in disease vectors such as mosquitoes and rodents |
| **More Variable Rain** | |
| Increased risk of extreme floods | • Death from drowning and injuries from flood<br>• Economic losses for people in low-lying areas along rivers and bay lands, especially those without reliable transportation<br>• Public health risks from damage to sanitation, utility, and irrigation systems<br>• Limitations on access to critical services<br>• Economic impacts on businesses, including agricultural operations, affected by flooding |
| **Sea Level Rise** | |
| Higher sea level and storm surge | • Physical danger and economic impact for people living near bay lands or the coast<br>• Disruption in the movement of people and goods<br>• Economic loss from inundation of agricultural land |

## Built Systems

Built systems include residential and non-residential buildings and facilities, and the infrastructure associated with providing water, sanitation, drainage, communications, transportation, and energy. These systems are necessary for maintaining a healthy and well-functioning society, and represent a huge capital investment by both private and public entities. Unfortunately, many built systems and structures are at increased risk of failure due to age and deferred maintenance. For example, Sonoma County's local road network is also falling into disrepair at an increasing rate. These existing risks are magnified when multiple systems fail at the same time (as in a flood, fire, or other calamity), resulting in cascading impacts throughout the built environment.

### Table 6-3. Climate Change Effects on Built Systems

| **Hotter, Drier Weather with Longer Summers** | |
|---|---|
| More extremely hot days | • Damage and disruption to paved roads, rail lines, bridges, electricity transmission lines, and solar and battery facilities<br>• Thermal expansion of bridges<br>• Spikes in energy and water demand; potential stress to supplies<br>• Reduced outputs from thermal power plants, transformers, and other parts of electric systems<br>• Brownouts and blackouts |
| More frequent and intense droughts | • Increased water demand and reduced supply<br>• Disruption of hydropower operations such as Warm Springs Dam; impacts on power generation facilities that rely on water for cooling<br>• Algae and bacterial growth in water supplies<br>• Increased pumping of groundwater leading to well failure, saltwater intrusion, and degraded water quality<br>• Increased evaporation from reservoirs |
| More frequent and intense wildfires | • Disruption of electricity transmission lines<br>• Impacts on roadways<br>• Subsequent landslides that close roads and bury infrastructure, including water supply wells |
| Fewer winter nights that freeze | • None identified |
| **More Variable Rain** | |
| Increased risk of extreme floods | • Less predictable reservoir operation<br>• Road closures, landslides, and loss of infrastructure such as bridges/culverts<br>• Increased potholes and roadway damage from intensity of rainfall<br>• Failure of stormwater and waste water treatment systems<br>• Increased cost and complexity for development and infrastructure projects and for retrofitting existing infrastructure |
| **Sea Level Rise** | |
| Higher sea level and storm surge | • Damage and/or closure of roads crossing former tidal or estuarine areas (Highways 1 and 37)<br>• Increased storm damage to boats and related shoreline infrastructure<br>• Flooding of low-lying infrastructure such as Sonoma Valley County Sanitation District<br>• Saltwater intrusion and reduced water quality<br>• Disruption of transit routes and travel delays |

## Natural and Working Lands

Natural lands include Sonoma County's public and private natural and open space areas and the ecosystems these lands support, including wildlife, streams and wetlands, and sensitive species and habitats. Working lands include Sonoma County's diverse and productive agricultural lands. Sonoma County's vineyards, farms, ranches, and timberlands are the cornerstone of the county's economy and add immeasurably to the area's scenic beauty.

Sonoma County has high biodiversity in many of its landscapes and species, potentially increasing the resilience of natural areas overall. However, the county also has many threatened and endangered species, some of which are found only in very limited areas. Stressors such as pollution, loss of streamflow, and invasive species are already causing numerous plants and animals to decline. Habitat fragmentation and development have also compromised the ecological integrity of some landscapes throughout the county, making them more susceptible to climate change hazards. The county's working lands are subject to these same hazards. Agricultural operations depend heavily on the region's historically moderate climate and are therefore vulnerable to the entire range of climate change hazards.

**Table 6-4. Climate Change Effects on Natural and Working Lands**

| **Hotter, Drier Weather with Longer Summers** | |
|---|---|
| More extremely hot days | • Loss of wine grape quality<br>• Land use pressure to develop vineyards closer to the coast<br>• Changes in yield, types, and cultivars of crops<br>• Increased animal vulnerability to pests, stress, and mortality<br>• Lower production in animals<br>• Reduced chill hours |
| More frequent and intense droughts | • Increased need for water agricultural land and water-dependent ecosystems<br>• Increased urban water use, at possible expense of agriculture water availability<br>• Shortage of animal feed or rise in cost and access<br>• Increased evapotranspiration from open water sources<br>• Decline or death of water-dependent plants and animals<br>• Potential change in suitable crop varieties, including wine grapes<br>• Increased tree stress and death in timberlands and other forests<br>• Increased off-stream storage of water for agriculture |
| More frequent and intense wildfires | • Loss of habitat and agricultural lands<br>• Death of wildlife<br>• Loss of recreational lands and commercial forests<br>• Losses from subsequent erosion and landslides, and sedimentation of streams and wetlands |
| Fewer winter nights that freeze | • Unpredictable, potentially sudden, shifts in populations of disease, pests, or invasive species<br>• Earlier vineyard bud break may lead to increased use of water for frost protection |
| **More Variable Rain** | |
| Increased risk of extreme floods | • Increased erosion and sediment pollution in streams and wetlands<br>• Damage to crops and agricultural lands |
| **Sea Level Rise** | |
| Higher sea level and storm surge | • Loss of prime recreational and natural areas, including marshes, beaches, mudflats, and dunes<br>• Risk of levee breaches and inundation of agricultural land in formerly tidal areas in southern Sonoma County |

## 6.4 Responding to Climate Change Vulnerabilities

The vulnerabilities outlined in Section 6.3 are significant and cut across virtually all of the county's human and natural systems. Fortunately, many entities in Sonoma County have already begun planning and implementing strategies to increase resilience and readiness for climate change. These strategies target public health and social vulnerability, energy independence, water resource planning, food security, transportation, and conservation. These existing efforts are too broad to fully capture here, but a sample of critical activities underway is summarized in Table 6-5.

Although impressive and forward-thinking, these current efforts only skim the surface of the effort needed to make our communities truly resilient in the face of climate change. While many entities are increasingly incorporating a climate-changed future into their planning, such as those listed in Table 6-5, a higher-level, more comprehensive approach is also needed to match the scale and variety of climate hazards facing Sonoma County. This broader effort has been led by RCPA and the NBCAI, a collaborative of local organizations. This includes the *Climate Hazards and Vulnerabilities* report that is the basis for this chapter. In 2015, NBCAI and RCPA also sponsored two events with broad participation that clarified the climate readiness challenge and its opportunities for Sonoma County. Section 6.4.1 describes these findings.

### 6.4.1 Sonoma County Climate Ready Goals

NBCAI, in conjunction with RCPA and other non-governmental partners, is developing a *Roadmap for Climate Resilience* in Sonoma County based on extensive input from public meetings, workshops, focus groups, and technical experts. Over 230 people participated. Out of these events and extensive discussion with multiple interest groups, NBCAI and RCPA developed the following mission for climate readiness efforts in Sonoma County.

***Increase the health and resilience of social, natural, and built resources to withstand the impacts of climate change.***

The nine goals listed in Table 6-6 are included as part of CA2020 to support this mission. Adoption of these goals by RCPA and local partner agencies (cities and the County) will help set the course for future actions that will increase the adaptive capacity of Sonoma County communities, reduce vulnerability to climate change, and make the county more climate-ready. These goals can also help prioritize the climate mitigation actions identified in Chapter 4 by identifying actions that will increase climate resilience as well as reducing GHG emissions.

## Table 6-5. Sample of Existing Local Efforts that Increase Resilience to Climate Change

| **Public Health and Social Vulnerability** | |
|---|---|
| Hazard Mitigation Planning | Every 5 years, the County updates a local Hazard Mitigation Plan that seeks to reduce death, injuries, property loss, and community disruption caused by natural hazards by analyzing those hazards and developing an implementation plan. Climate change is exacerbating hazards that are already prepared for through the Hazard Mitigation Plan. |
| Health Action | Health Action is the framework for a community engagement effort, backed by the County, to create a healthier Sonoma County for all residents. Pursuit of Health Action goals in education, health care, and economic security will increase the adaptive capacity of the Sonoma County communities that are most vulnerable to climate change. |
| **Energy** | |
| Energy Independence | The County and cities have implemented a countywide renewable energy and energy efficiency retrofit program that provides incentives, financing, tools, and technical assistance to residential and non-residential property owners. Reducing energy use and increasing on-site generation not only lowers GHG emissions, it also reduces energy costs and helps minimize the health and economic impacts of future climate change-related outages. |
| Sonoma Clean Power | The County and cities have created a community choice aggregation program that allows more local control in obtaining lower-emission, lower-cost, and more distributed power supplies. These distributed and renewable power sources are less vulnerable to climate-related disruption and come back online faster following an emergency. |
| **Water** | |
| Integrated Water Resource Planning | The Sonoma County Water Agency's *Water Supply Strategies Action Plan* is a framework for regional integrated water management to increase water supply system reliability, resiliency, and efficiency in the face of limited resources, regulatory constraints, and climate change. |
| Groundwater Management | Sonoma County Water Agency has led development of Groundwater Management Plans in the Sonoma Valley and Santa Rosa Plain that will improve the ability of groundwater-dependent communities, agricultural operations, rural residents, and ecosystems to function during drought periods. Sonoma County cities, SCWA, the County and water districts are currently engaged in early implementation of the state's new Sustainable Groundwater Management Act. |
| End-use Water Efficiency | Municipal water and sanitation utilities throughout the county have established programs to support property owners in reducing water use while investing in upgrades to their properties. |
| On-site Water Storage | The Resource Conservation Districts have led projects to develop on-site water storage on rural and agricultural properties to increase drought resiliency |
| **Food** | |
| Sonoma County Healthy and Sustainable Food Action Plan | The County Department of Health Services has partnered with the Food System Alliance to develop a guide to local action on food production, land and natural resource stewardship, job development, public health, and food system equity, all of which help increase the community's climate resilience. It also encourages practices to support the agricultural sector's ability to adapt to climate change. |
| **Transportation** | |
| Transportation Planning and Investment | Many projects to modernize the transportation system and increase the viability of multiple mobility options are underway through implementation of the Comprehensive Transportation Plan adopted by Sonoma County Transportation Authority. The SMART passenger rail will begin operations in 2016. Countywide Bicycle and Pedestrian Master Plan implementation and Safe Routes to Schools projects support expanded use of lower-cost transportation options that are more reliable under projected climate conditions. |
| Highway 37 Sea Level Rise planning | Due to its proximity to San Pablo Bay, Highway 37 is at significant risk from sea-level rise and storm surge. Local, regional, and state partners are working to address this infrastructure vulnerability while incorporating habitat enhancements that promote resilience to flooding and storm surge. |
| **Natural and Working Lands** | |
| Climate Action through Conservation | The Sonoma County Agricultural Preservation and Open Space District was created in 1990 to protect working farms and ranches, scenic hillsides, and natural areas that make the county special. The District has preserved over 100,000 acres to date. The District is also working on a *Climate Action Through Conservation* program to incorporate GHG mitigation and sequestration benefits into land use choices, as well as evaluating the ecosystem services provided by landscapes that will be increasingly important under future climate projections. |

## Table 6-6. Climate Change Adaptation Goals and Opportunities

| Goals | Opportunities | Climate Hazards Addressed |
|---|---|---|
| Promote healthy, safe communities | Invest in measures to increase community knowledge and capacity to respond and adapt to climate hazards, including improving baseline health, well-being, and financial security, especially in vulnerable populations. Link vulnerable populations to services that reduce the safety, health, and financial risks related to climate hazards. Reduce non-climate economic and health stressors. | All hazards, especially those sensitive to demographic and economic changes |
| Protect water resources | Conserve and reuse water, protect and enhance groundwater recharge areas, capture storm- and flood water, protect streamside areas, invest in natural infrastructure. Reduce non-climate stressors such as hydro-modification, pollution, and overuse of water. | Drought, flooding, and infrastructure failure risks to water quantity and quality |
| Promote a sustainable, climate-resilient economy | Better define the economic risks of climate change. Communicate to businesses and the broader community about practices that contribute to climate resilience and how to implement them. Reduce non-climate stressors. | All hazards, especially those sensitive to demographic and economic changes |
| Mainstream the use of climate projections (not just past patterns) in planning, design, and budgeting | Educate and share information among government agencies. Create and promote guidelines for how to use climate information in planning and decision making. | All hazards, especially sea-level rise, drought, wildfire, and flooding |
| Protect coastal, bayside, and inland buffer zones | Protect, expand, and enhance wetlands, water source areas, fire management zones, and flood zones. Review/revise land management plans, development codes, parks plans, and prevention and response plans for floods and fires. Reduce non-climate stressors in these areas. | Sea-level rise, changing temperature and rain patterns, drought, wildfire |
| Promote food system security and agricultural climate preparedness | Promote peer-to-peer agricultural adaptation networking, including potential need to cultivate alternative crops or adopt new agricultural land management strategies. Reduce non-climate stressors, such as the high cost of land for food production. | Changing temperature and rain patterns, drought, higher food prices |
| Protect infrastructure: buildings, energy systems, communications systems, water infrastructure, and transportation systems | Conduct a risk assessment by evaluating potential climate impacts on key infrastructure, buildings, and transit systems. Invest in strategies to ensure the long-term sustainability and reliability of energy resources. Reduce non-climate stressors such as deteriorating infrastructure. | Drought, flooding, wildfire, and extreme heat |
| Increase emergency preparedness | Support continued interagency emergency planning. Educate the public about climate hazards. Assess and address gaps in vulnerable populations' capacity to respond to extreme events. Reduce non-climate stressors such as forest health problems and provide adequate funding for emergency preparedness and response. | Public health and safety impacts of heat, flooding, and wildfire |
| Monitor the changing climate and its biophysical effects in real time | Measure actual conditions to validate and/or refine models of climate and climate change effects in order to plan and manage with better information. | All hazards |

### 6.4.2 Climate Resilience Co-benefits from GHG Reduction Strategies in CA2020

The GHG reduction measures described in Chapter 4, *Reducing Community Emissions*, will also contribute to the climate readiness of Sonoma County and its resources. Measures under Building Energy will help conserve energy and expand localized, renewable energy generation. These measures will reduce community reliance on the electrical grid, which is vulnerable to climate hazards including extreme weather events, sea-level rise, and heat waves. This, in turn, will help reduce climate-related personal and economic risks for residents and businesses in Sonoma County.

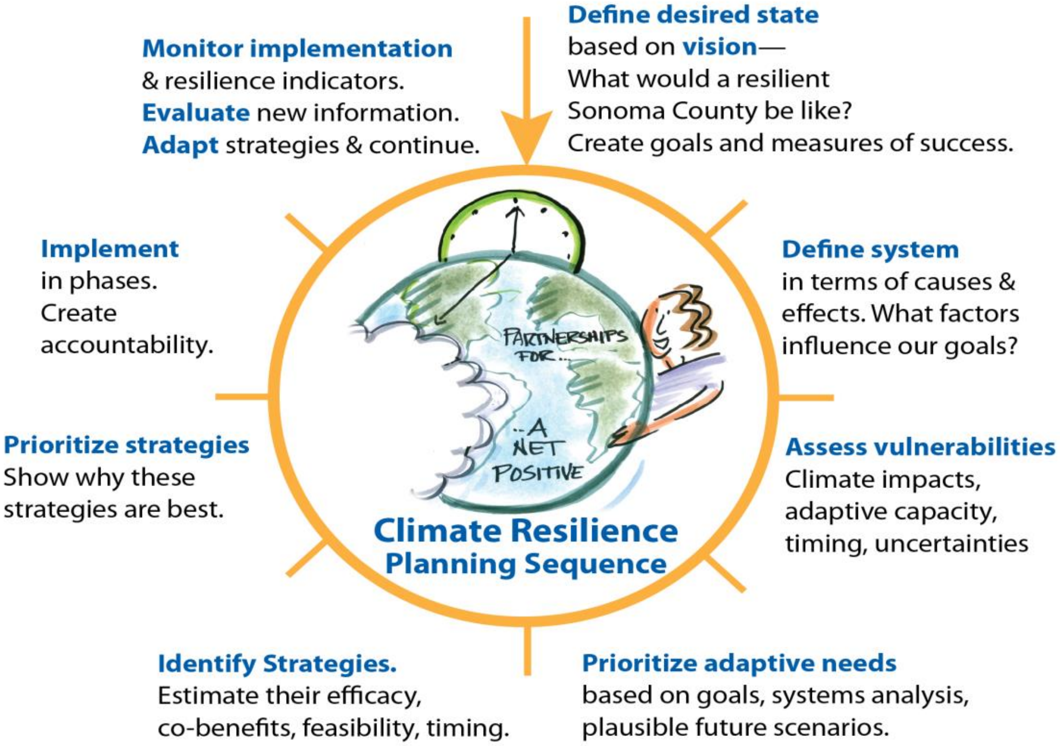
GHG reduction measures under on-road transportation will reduce vehicle miles traveled and increase alternative modes of travel, such as walking, biking, and transit. These measures help reduce stress on the county's aging transportation infrastructure, which is also vulnerable to climate change hazards. Reducing stress on the transportation system helps protect a significant capital investment and avoid service disruptions and the resulting risks to residents and businesses throughout the county.

GHG reduction measures for other sources also provide various resiliency benefits. Strategies to reduce emissions from livestock and fertilizer will also help preserve soil fertility, conserve water, reduce energy use, and support sustainable agricultural products, all of which benefit a community adapting to a changed climate. Increasing reuse of materials and recycling from solid waste helps reduce natural resource use in the manufacture of goods from original materials, thus helping to preserve water supplies, energy supplies, and natural resources that will likely be stressed in the future due to climate change impacts. Protection or enhancement of forests, wetlands, floodplains, or stream systems will not only increase carbon sequestration, but will also bring benefits for water supply, flood control, temperature moderation, and pollination. GHG reduction measures that reduce water demand help reduce climate change vulnerabilities by reducing the demand for stressed water supplies, reducing the amount of water treatment, and reducing the costs associated with water consumption.

## 6.5 Next Steps

The pervasive nature of anticipated climate change hazards in Sonoma County requires that both public and private entities play a role in enhancing local resilience. The vulnerability assessment summarized above represents some of the first steps in the overall climate readiness sequence, as shown on Figure 6-7.

**Figure 6-7. Overall Climate Readiness Sequence for Sonoma County**


Define desired state based on vision— What would a resilient Sonoma County be like? Create goals and measures of success.
Define system in terms of causes & effects. What factors influence our goals?
Assess vulnerabilities Climate impacts, adaptive capacity, timing, uncertainties
Prioritize adaptive needs based on goals, systems analysis, plausible future scenarios.
Identify Strategies. Estimate their efficacy, co-benefits, feasibility, timing.
Prioritize strategies Show why these strategies are best.
Implement in phases. Create accountability.
Monitor implementation & resilience indicators. Evaluate new information. Adapt strategies & continue.
PARTNERSHIPS FOR...
..A NET POSITIVE
Climate Resilience Planning Sequence

In line with the goals summarized in Table 6-6, existing efforts to prepare for climate change should be integrated, expanded, and evaluated to explore how well they are serving the community by increasing climate resilience.

On an ongoing basis, climate readiness strategies should be explicitly integrated into existing plans and programs that are already used to promote public health, safety, and prosperity in Sonoma County, including the following.

- Hazard Mitigation Plans. Sonoma County's 2016 hazard mitigation plan will be the first to incorporate current knowledge about climate change and climate hazards facing the county.
- General Plans, specific plans, and the Local Coastal Plan, particularly as they relate to locations vulnerable to flood, landslide, and coastal hazards, and locations important for water supply, groundwater recharge, and shoreline protection. As required under new state law (Senate Bill 379, 2015), general plan safety elements must include "climate adaptation and resiliency strategies," including "goals, policies, and objectives for their communities based on the most current information available regarding climate change adaptation and resiliency." Senate Bill 379 also allows jurisdictions to use adopted climate action plans, such as CA2020, to meet this new requirement.

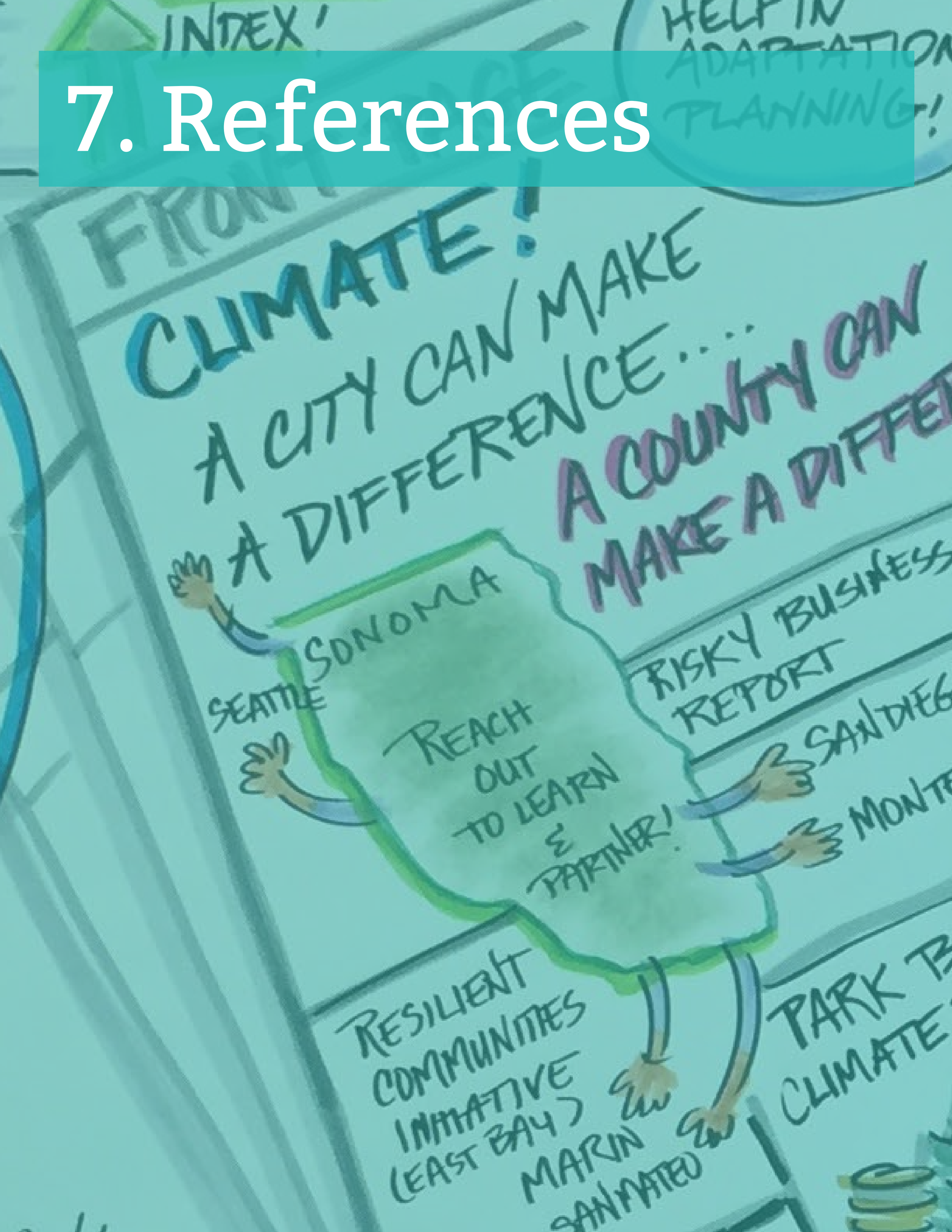
- Parks, trails, and open space plans.
- Water supply, stormwater, and flood management plans and ordinances. Sonoma County Water Agency is also undertaking an in-depth climate adaptation plan for its operations.
- Environmental impact reports.
- Transportation and other capital improvement plans.
- Public health monitoring.
- Emergency preparedness plans.
- Street tree and water-efficiency ordinances.
- Zoning, building, and fire codes.
- Groundwater management plans.
- Administrative policies, procedures, and initiatives.

In every area, from road-building to public health to transit, help is needed to translate technical information about a changed climate future into appropriate actionable steps. Climate adaptation efforts in Sonoma County have already identified a need for Climate Ready Advisors who can help residents, businesses, local governments, and non-governmental organizations make sense of the growing volume of climate hazard information and produce climate-smart decisions, plans, budgets, and priorities.

Local leaders, residents, and stakeholders, such as RCPA, must work together to respond to the county's climate vulnerabilities, implement the goals in Table 6-6, and evaluate how well current and new strategies are increasing community readiness for climate change.

An effective response to the climate challenge requires substantial investment, and therefore calls for a deep analysis of how to make that investment cost effective. As the cities and County have already done with Health Action and an array of new clean-power programs, the community will need to re-imagine and re-align its investments so that new and existing incentives, disincentives, and funding streams result in climate-resilient behavior throughout Sonoma County.

# 7. References


INDEX!
HELP IN ADAPTATION PLANNING!
FRONT
CLIMATE!
A CITY CAN MAKE A DIFFERENCE....
A COUNTY CAN MAKE A DIFFE
SONOMA
SEATTLE
REACH OUT TO LEARN & PARTNER!
RISKY BUSINESS REPORT
SAN DIEG
MONTE
RESILIENT COMMUNITIES INITIATIVE (EAST BAY)
MARIN
SAN MATEO
PARK B
CLIMATE

# Chapter 7
# References

## 7.1 Chapter 1

### 7.1.1 Print and Web References

Blasing, T. J. 2014. *Recent Greenhouse Gas Concentrations*. DOI: 10.3334/CDIAC/atg.032. Updated February.

California Air Resources Board. 2014. *California Greenhouse Gas Inventory for 2000–2012— by Category, as Defined in the 2008 Scoping Plan*. Last Revised: August 1, 2013. Available: <http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-12_2014-03-24.pdf>. Accessed: April 28, 2015.

Center for Climate and Energy Solutions. No date. *The Greenhouse Effect*. Available: <http://www.c2es.org/facts-figures/basics/greenhouse-effect>. Accessed: April 28, 2015.

City of Santa Rosa. 2012. *Climate Action Plan*. June 5. Available: <http://ci.santa-rosa.ca.us/doclib/Documents/CDP_SR_FINAL_CAP_20120711.pdf>. Accessed: April 30, 2015.

Climate Protection Campaign. 2008. *Sonoma County Community Climate Action Plan.* October. Available: <http://www.coolplan.org/ccap-report/CCAP_Final_11-05-08.pdf>. Accessed: April 30, 2015.

Cook, J., D. Nuccitelli, S. Green, M. Richardson, B. Winkler, R. Painting, R. Way, P. Jacobs, and A. Skuce. 2013. Quantifying the Consensus on Anthropogenic Global Warming in the Scientific Literature. *Environmental Research Letters* 8(2):024024. Available: <http://iopscience.iop.org/1748-9326/8/2/024024/pdf/1748-9326_8_2_024024.pdf>. Accessed: April 28, 2015.

Maizlish, N., J. Woodcock, S. Co, B. Ostro, A. Fanai, and D. Fairley. 2011. *Health Co-Benefits and Transportation-Related Reductions in Greenhouse Gas Emissions in the Bay Area*. November. Available: <http://www.cdph.ca.gov/programs/CCDPHP/Documents/ITHIM_Technical_Report11-21-11.pdf>. Accessed: May 21, 2014.

Intergovernmental Panel on Climate Change. 2013. *Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Available: <http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf>. Accessed: April 28, 2015.

U.S. Environmental Protection Agency. 2014. *Greenhouse Gas Equivalencies Calculator*. Last updated: April 16, 2014. Available: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results>. Accessed: May 1, 2015.

U.S. Environmental Protection Agency. 2015. *Sources of Greenhouse Gas Emissions*. Available: <http://www.epa.gov/climatechange/ghgemissions/sources.html>. Accessed: April 28, 2015.

### 7.1.2 Personal Communications

*None*

## 7.2 Chapter 2

### 7.2.1 Print and Web References

California Air Pollution Control Officers Association. 2010. *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*. August. Available: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.

California Air Resources Board. 2007. *California Greenhouse Gas Inventory – By IPCC Category* November 19. Available: <http://www.arb.ca.gov/cc/inventory/archive/tables/ghg_inventory_ipcc_90_04_sum_2007-11-19.pdf>. Accessed: June 25, 2015.

California Air Resources Board. 2014a. *California Greenhouse Gas Inventory for 2000-2012 – by Category as Defined in the 2008 Scoping Plan*. March 24. Available: <http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-12_2014-03-24.pdf>. Accessed: June 25, 2015.

California Air Resources Board. 2014b. *2020 BAU Forecast*. May 27. Available: <http://www.arb.ca.gov/cc/inventory/data/tables/2020_bau_forecast_by_scoping_category_2014-05-22.pdf>. Accessed: June 25, 2015.

California Air Resources Board. 2014. *First Update to the Climate Change Scoping Plan*. May. Available: <http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf>. Accessed: May 4, 2015.

California Department of Finance. 2005. E-6 Revised Historical Population Estimates and Components of Change, July 1, 1990-2000. February. Available: <http://www.dof.ca.gov/research/demographic/reports/estimates/e-6/1990-2000/documents/E-6_90-00.xls>. Accessed:

California Department of Finance. 2014. Report P-1 (Total Population) State and County Population Projections July 1, 2010-2060 (5-year increments). December 15. Available: <http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/P-1_Total_CAProj_2010-2060_5-Year.xls>. Accessed: June 25, 2015.

California Department of Water Resources. 2015. Basins and Subbasins of the North Coast Hydrologic Region. Last modified: 03/25/2015. Available: <http://www.water.ca.gov/groundwater/bulletin118/northcoast.cfm>. Accessed: July 6, 2015.

California Energy Commission. 2004. *Baseline Greenhouse Gas Emissions for Forest, Range and Agricultural Lands in California*. Available: <http://www.energy.ca.gov/pier/project_reports/500-04-069.html>. Accessed: May 12, 2015.

Greenblatt, Jeffery B. 2013. *Estimating Policy-Driven Greenhouse Gas Emissions Trajectories in California: The California Greenhouse Gas Inventory Spreadsheet (GHGIS) Model*. November. Available: <http://eetd.lbl.gov/sites/all/files/lbnl-6451e.pdf>. Accessed: May 4, 2015.

ICLEI – Local Governments for Sustainability USA. 2012. *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions.* Available: <http://www.icleiusa.org/tools/ghg-protocol/community-protocol>. Accessed: April 30, 2015.

Kroodsma, D. and C. Field. 2006, *Carbon Sequestration in California Agriculture, 1980 – 2000.* Ecological Applications 16 (5), 2006, pp 1975-1985.

National Oceanic and Atmospheric Administration. 2014. *The NOAA Annual Greenhouse Gas Index (AGGI)*. Last updated: Summer 2014. Available: <http://www.esrl.noaa.gov/gmd/aggi/aggi.html>. Accessed: May 4, 2015.

Sonoma County. No Date. *Sonoma County Vegetation Mapping & Lidar Program.* Available: <http://sonomavegmap.org/>. Accessed: July 7, 2015.

Sonoma County Agricultural Commissioner. 2011. *Sonoma County 2010 Crop Report*. May. Available: <http://www.sonoma-county.org/agcomm/pdf/crop_reports/2010_crop_report.pdf>.

The Nature Conservancy and Sonoma County Agricultural Preservation and Open Space District. 2016. *Conserving Landscapes, Protecting the Climate: The Climate Action through Conservation Project.* Sonoma County Estimates of 2010 Carbon Stocks by Landcover Class and Carbon Pool. Available: <http://scienceforconservation.org/downloads/climate_action_through_conservation>. Accessed: March 2, 2016

### 7.2.2 Personal Communications

Barney, C. Senior Transportation Planner, Sonoma County Transportation Authority. September 11, 2013. Email message to Brian Schuster (ICF International) with socioeconomic data for Sonoma County.

# 7.3 Chapter 3

## 7.3.1 Print and Web References

Center for Climate Protection. 2014. *Proven and Promising Climate Measures from U.S. Communities for Possible Application in Sonoma County*. Available: http://climateprotection.org/proven-promising-climate-measures-u-s-communities-possible-application-sonoma-county/. Accessed: April 26, 2016

ConSol. 2010. *Water Use in the California Residential Home*. January. Available: <http://www.cbia.org/go/cbia/?LinkServID=E242764F-88F9-4438-9992948EF86E49EA>. Accessed: May 21, 2014.

Energy + Environmental Economics. 2015. *Summary of the California State Agency's PATHWAYS Project: Long-term Greenhouse Gas Reduction Scenarios*. January 26. Available: <http://www.energy.ca.gov/commission/fact_sheets/documents/E3_Project_Overview_20150130.pdf>. Accessed: July 10, 2015.

ICLEI – Local Governments for Sustainability USA. 2012. *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions.* Available: <http://www.icleiusa.org/tools/ghg-protocol/community-protocol>. Accessed: April 30, 2015.

NCE. 2014, *California Local Streets & Roads Needs Assessment 2014 Update*. Prepared for: Save California Streets. October. Available: <http://www.savecaliforniastreets.org/wp-content/uploads/2014/10/2014-Statewide-Report-FINAL-10-28-14.pdf>. Accessed: July 16, 2015.

U.S. EPA. 2015. *Overview of Greenhouse Gases*. Last Updated: May 7, 2015. Available: <http://epa.gov/climatechange/ghgemissions/gases/n2o.html>. Accessed: July 9, 2015.

## 7.3.2 Personal Communications

*None*

# 7.4 Chapter 4

## 7.4.1 Print and Web References

California Air Resources Board. 2014b. *First Update to the Climate Change Scoping Plan*. May. Available: <http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf>. Accessed: May 21, 2014.

Hansen J., M. Sato, P. Kharecha, D. Beerling, R. Berner, V. Masson-Delmotte, M. Pagani, M. Raymo, D. L. Royer, and J. C. Zachos. 2012. Target Atmospheric CO2: Where Should Humanity Aim? Available: <http://arxiv.org/ftp/arxiv/papers/0804/0804.1126.pdf>. Accessed: May 7, 2015.

Intergovernmental Panel on Climate Change. 2013. *Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Available: <http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf>. Accessed: April 30, 2014.

National Oceanic and Atmospheric Administration. 2014. *The NOAA Annual Greenhouse Gas Index (AGGI)*. Last updated: Summer 2014. Available: <http://www.esrl.noaa.gov/gmd/aggi/aggi.html>. Accessed: November 12, 2014.

United Nations. 1992. *United Nations Framework Convention on Climate Change (UNFCC)*. Article 2. Available: <http://unfccc.int/resource/docs/convkp/conveng.pdf>.

### 7.4.2 Personal Communications

*None*

## 7.5 Chapter 5

### 7.5.1 Print and Web References

Gilleran Energy Management, Inc. 2015. *Windsor Greenhouse Gas Action Planning Update*. Page 5-119. February 10. Available: <http://windsor-ca.granicus.com/MetaViewer.php?view_id=2&clip_id=509&meta_id=35924>. Accessed: February 5, 2016.

Metropolitan Transportation Commission/Association of Bay Area Governments. 2010. *Bay Area Census*. Available: <http://www.bayareacensus.ca.gov/cities/cities.htm>. Accessed: July 13, 2015.

U.S. Census Bureau. 2014. Quick Facts. Available: <http://www.census.gov/quickfacts/>. Accessed: July 14, 2015.

California Department of Finance. 2015. *E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011-2015 with 2010 Census Benchmark*. May. Available: <http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2011-20/documents/E-5_2015_InternetVersion.xls>. Accessed: July 1, 2015.

U.S. Energy Information Administration. 2009. *Residential Energy Consumption Survey 2009 Survey Data* – Table CE2.5. Available: <http://www.eia.gov/consumption/residential/data/2009/index.cfm?view=consumption#summary>. Accessed: July 1, 2015.

U.S. Geological Survey. 2014. *Estimated Use of Water in the United States County-Level Data for 2010*. Available: <http://water.usgs.gov/watuse/data/2010/index.html>. Accessed: July 1, 2015.

### 7.5.2 Personal Communications

*None*

## 7.6 Chapter 6

### 7.6.1 Print and Web References

Flint, L. E., A. L. Flint, J. H. Thorne, and R. Boynton. 2013. *Fine-scale hydrologic modeling for regional landscape applications: the California Basin Characterization Model development and performance*. Ecological Processes 2:25. Available: <http://www.ecologicalprocesses.com/content/pdf/2192-1709-2-25.pdf>. Accessed: January 19, 2016.

Cornwall, C., S. Moore, D. DiPietro, S. Veloz, L. Micheli, L. Casey, and M. Mersich. 2014. *Climate Ready Sonoma County: Climate Hazards and Vulnerabilities*. Prepared as part of Climate Action 2020 by North Bay Climate Adaptation Initiative for Sonoma County Regional Climate Protection Authority. Santa Rosa, California. Available: <http://www.sctainfo.org/pdf/Climate%20Ready_Hazards_Vulnerabilities.pdf>.

### 7.6.2 Personal Communications

*None*